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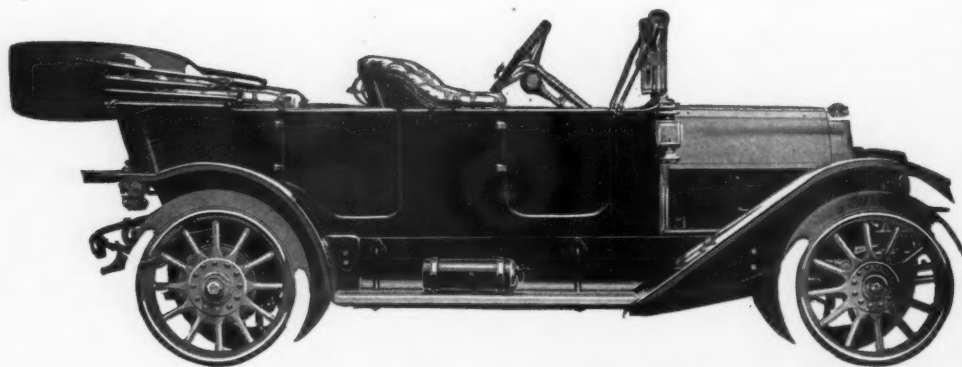
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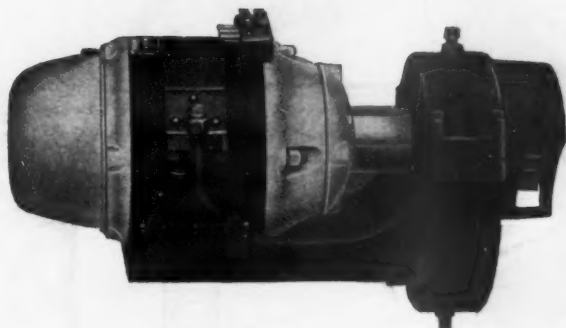
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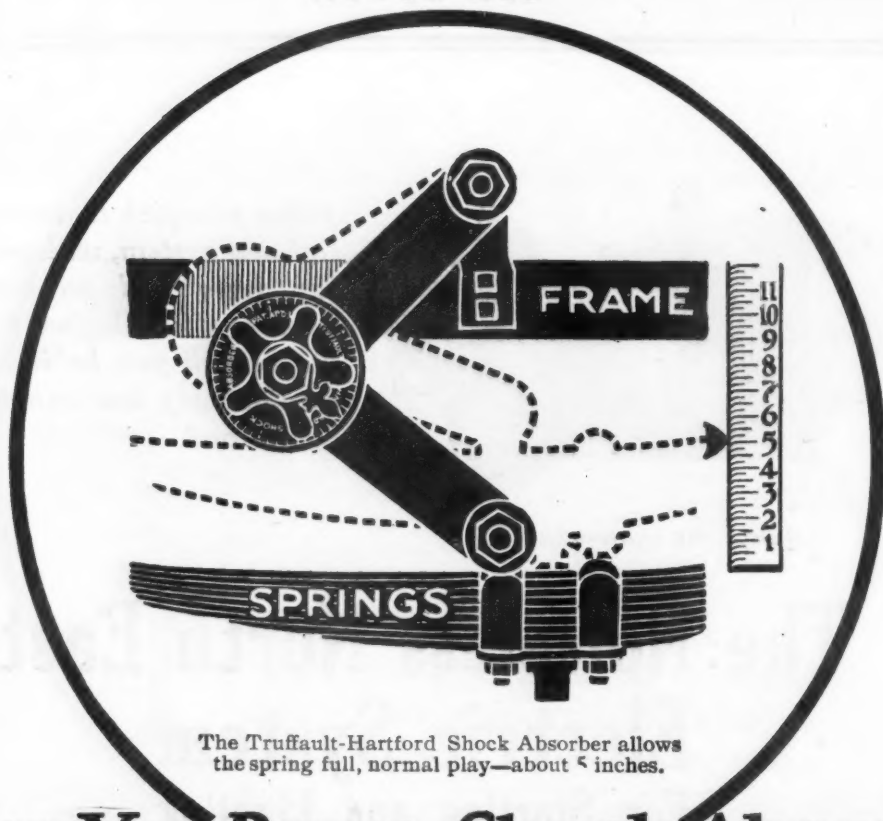
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FRENCH CENTRAL LAKE, ONE OF THE MOST BEAUTIFUL ON VANCOUVER ISLAND

Vancouver Island—A Land of Enchantment

TO the motorist who has yet to explore Vancouver island, a tour through this, the most beautiful of all the beauty spots in Canada, will be an expedition of revelations. Not only does such a trip embrace the most gorgeous mountain scenery, with entrancing glimpses of sea and lake, canyon and fertile valley, but the prospect of good roads and delightful climate as well. In fact, the natural beauties of British Columbia reach a supreme manifestation on Vancouver island which is both an Eden for the nature student and a Mecca for the fisherman and hunter. Haloed by sunshine and washed by the cooling waters of the Pacific ocean, the island is a land of enchantment, as full of romance as the Treasure island of Stevenson.

Conditions Different Now

Up to a short time ago the condition of the highways upon the island was such as to prohibit a tour meriting the term pleasant. Fortunately for the motorist, however, the roads have not only been greatly improved but last year the marking of the route of the Canadian highway was started. On May 4 the first post on this ocean-to-ocean trail was placed in position in the old town of Alberni on the extreme west coast of the island. It was a great event, the greatest ever celebrated on the banks of the Alberni canal, an event fraught with deep significance to the motorist. One hundred motor cars

By A. Fraser Reid

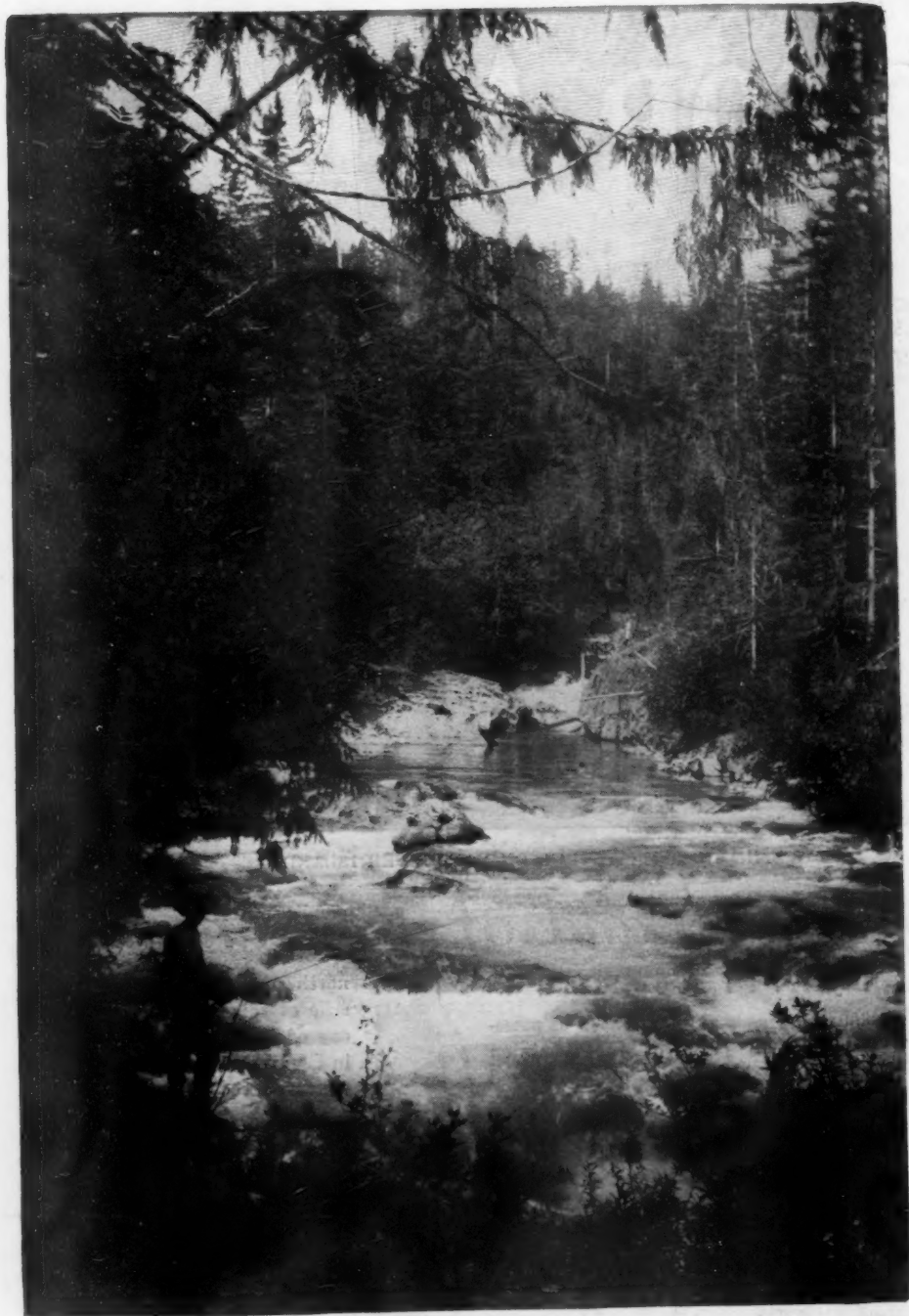
and 800 visitors—many being men of prominence from all parts of the dominion and the Pacific coast cities of the United States—took part in the ceremonies. The planting of the guide post was the initial step in the establishment of a 4,000-mile route that will stretch across the dominion, a campaign that will be completed only when good smooth roads, stretching from the shores of the Pacific to the rugged coast line of the Atlantic ocean, are constructed.

Roads Well Maintained

In addition to this huge project of building a transcontinental highway, and subsidiary to it, there are already beautifully-kept roads traversing almost the entire island. From Nanaimo, the seat of the herring fishing industry, to Parksville, the Canadian highway is merged in the island highway which runs from Victoria to a point beyond Campbell river and will eventually extend to the extreme

north end of the island. Every mile of this magnificent road is one of scenic grandeur, rivaling in beauty and attractiveness the vistas on the mainland of British Columbia. Crossing a rolling wooded plateau to the Malahat drive, a dozen miles from Victoria, along Nanoose bay to the shores of Cameron lake, and approaching Alberni, the scenery is unsurpassed on the continent and finds a peer in few parts of the globe. For many miles the road runs parallel with the steep wall of deep fjords, eclipsing in beauty the famed fjords of Norway. Again the road overlooks the gulf of Georgia with its innumerable isles. On one side it parallels the course of the steamers;





DRINKWATER CREEK, A REAL BEAUTY SPOT ON ISLAND

on the other, it follows the ribbons of steel which denote the presence of a railway on the island. It crosses the Cowichan valley, whose farms, orchards and dairies supply Victoria with butter and eggs, apples and strawberries and cream. The road follows the shore of Oyster bay, where we get our appetizers, and through to Ladysmith, the island's newest coal mining town.

Victoria Worth a Visit

Victoria, the starting point of our tour and the capital of British Columbia, is a beautiful city and well worth an extended visit. Easily reached by a 4-hour sail from either Vancouver, B. C., or Seattle, Wash., it may not be out of place in this rambling article to dwell for a short time on the charms of this picturesque city.

Variety is the spice that makes a city attractive to visitors; novelty, a magnet which draws the stranger to distant shores; climate, the basis of discussion when the traveler plans a trip which will carry him far from home. Viewed from all three standpoints Victoria takes premier place on the island as a city of interest and delight. The crossing of the isothermal lines close to the city, insuring ideal temperature both in winter and summer, demonstrate the advantages of the capital city in respect to climate and other attractions.

Sailing into the harbor, the most blasé traveler could not help but enthuse over the scene which greets his eye. Back of the harbor rise the Parliament buildings, edifices fronting expansive lawn and which

have drawn the unstinted praise of tourists from all lands. Facing the harbor, on Government street, is the Empress hotel, a magnificent building owned by the Canadian Pacific Railroad Co., and surrounded by blossoming gardens which extend the entire length of the water front, making an attractive sight.

To the left are the general postoffice and customs house, completing a background of architectural beauty coupled with strength and solidity, while beyond the Parliament buildings in the distance tower the snow-capped peaks of the Olympic mountains.

A visit to the Parliament building proves very interesting. The history of British Columbia, from the pioneer days to the present time, is found in its archives, which are most comprehensive.

A comprehensive natural history museum occupies the east wing of the building, in which a beautiful collection of animals, birds and fishes of the provinces is carefully classified. In addition, we notice also a museum of minerals, of forestry and agriculture.

Run Through Beautiful Parks

But it is a beautiful sunny day and the lure of outdoors is all-compelling and irresistible. Let us take a run through one of the beautiful parks for which Victoria is noted. Beacon Hill park commands a fine, sweeping view of the straits of Juan de Fuca and the mountains. To the west the blue-rimmed crests of the Sooke hills flank the horizon and the white sails of passing ships and the smoke trails from distant steamers lend a picturesque touch to the quiet beauty of the scene. The golden glory of the old country broom and gorse sheds a welcome blaze of color. The translucent swan lake, seafish pond, the floral wealth all blend in harmony, which is inspiring and which interests tourists.

The city has a charming flavor of old times. Unlike most western Canada cities, Victoria is quite dignified. Here the hustler is an alien. One of the oldest cities of the Pacific coast, it has undoubtedly acquired the dignity of years. Victoria has left behind the youthful impetuosity which still marks Vancouver and Seattle, its rivals to the north and south, but may seem to the average American "just a little slow." This may be, still it has many charms of scenery, woodland drives, sweeps of fine sandy beach and cottage-dotted shores. The oftener you visit Victoria, the better you like it. The citizens of the Capital City have some excuse for their belief that Victoria is the only place on earth worthy of mention and they are most enthusiastic over the attractiveness of their big city.

In the vicinity of the capital we find many enjoyable runs. The 7 or 8-mile trip to the quaint old village of Esquimalt takes us through pleasant leafy lanes. The land-locked harbor at Esquimalt was for many years Great Britain's



SCENIC SPOT NEAR CAMERON LAKE

only naval station on the Pacific coast; the dockyard has now been transferred to the Canadian government and forms the Pacific base of the Canadian navy. The village itself is interesting and very old-fashioned, with houses built mainly on rocky ground reclaimed from the sea at some time bygone.

The return is made by a different route, crossing the steel bridge at Point Ellice and leading us into Gorge park, the city's open-air amusement park and a miniature Coney Island. Standing on the bridge and

letting our eyes wander up the fine wide sweep of Victoria Arm, we are favorably impressed with the excellent bathing and boating facilities. We are sorely tempted, as the sparkling waters look cool and refreshing, and, like poor old Father Adam, we fall. Victoria Arm is one of the most beautiful stretches of salt water on the Pacific coast. The fine wooded banks provide a pleasant retreat from the sun's rays.

Sight-Seeing Joys

From the park we have a fine ride back through the city and out to Oak bay, an attractive spot, within a few minutes' run of which is a beautifully sheltered golf course. A run through the residence district shows many luxurious homes. Rockland avenue, Victoria's Riverside drive, is a beautiful old-world thoroughfare, redolent with the scent of honeysuckle and roses. Completely sheltered from the dust and din of the city, flowers of every hue delight our eye. The climate is such that flowers bloom luxuriantly the year round. Delicate plants thrive in the open air at all seasons. Foliage and grass are green as living emeralds, lawns are veritable carpets of smooth velvet, while the leafy mountain summits glisten white and dazzling in the sun. Nowhere else do we find such a combination of beauty, healthy atmosphere and rich natural advantages.

The climate of the island is equal to that of the best of the much-vaunted resorts of California, without their excessive heat. Vancouver island has been properly termed the "Garden of Canada."

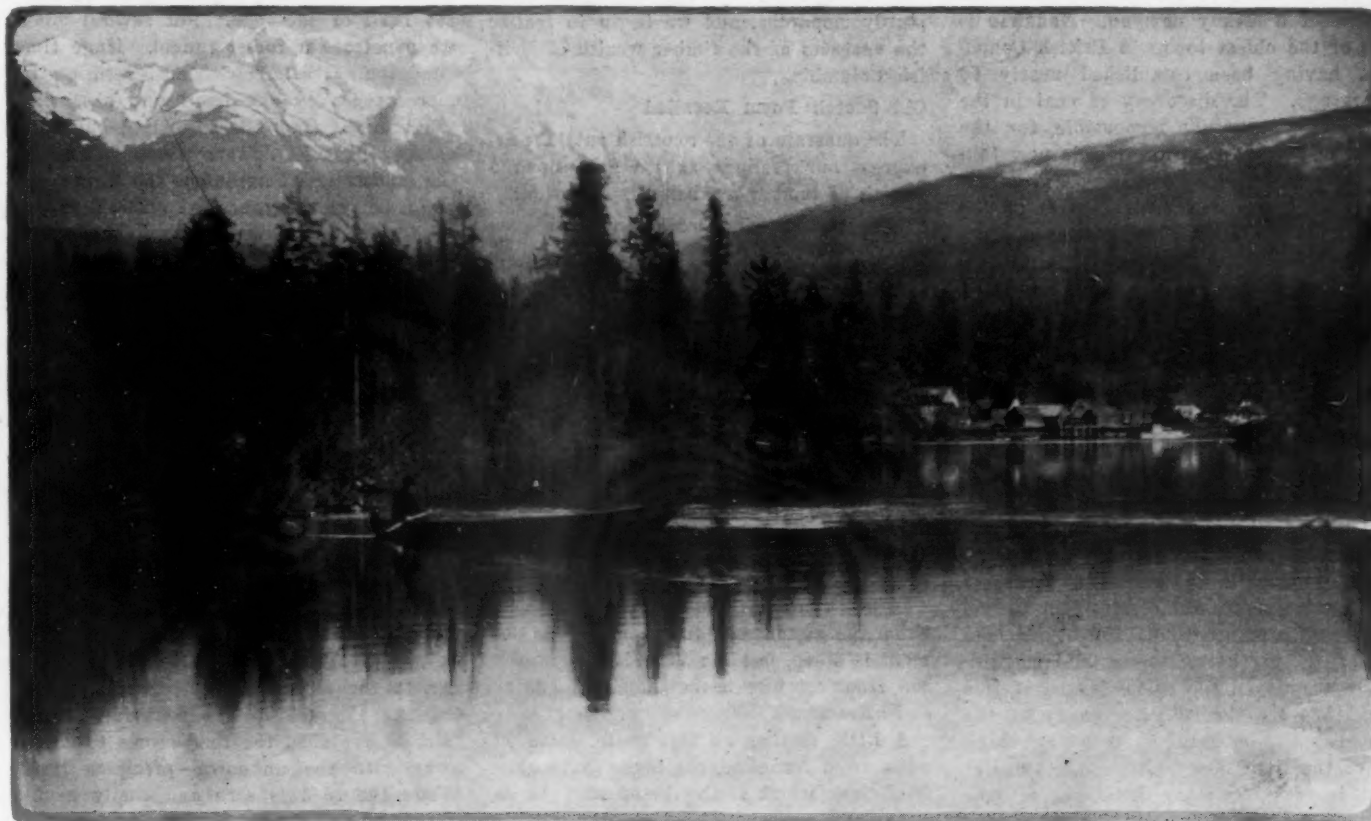
Hardly have we left Victoria, on our

tour of the island, when a flock of blue grouse rise out of the brush with a whirr, making for the nearest tree. The woods seem to be literally overflowing with quail and grouse, whole flotillas of the game birds being observed at different points, insuring fine sport for the hunter.

Our first halt is at Duncan, a little village nestling in the hollow of the mountains and famed for its fishing streams. If you are a disciple of Isaac Walton, this is the ideal spot for you to spend a pleasant day or so. Here you can rest, enjoy a sun bath and play your rod for the wily trout, which are there waiting you in large numbers if you know how. Duncan is little more than a hamlet, but the comfort and enjoyments are good and you will have no fault to find with the accommodations. The principal hostelry takes its name from Mount Tzouhalem, that rears its giant head but a short distance away.

Ladysmith Typical Mining Center

Ladysmith, a run of some 10 miles over a rather indifferent stretch of road, is a typical mining center. It is a neat, clean little city with a charming outlook on the gulf, and a few hours spent here will not be entirely wasted. The Ladysmith falls should not be missed, as they form a pretty picture and make a good subject for the camera. The run of 20 miles between Ladysmith and Nanaimo is through open, gently undulating country. Beautiful shade trees line the roadway on either side, and we enjoy the ride under the sweeping canopy of overhanging leaves. The road is good and we are in fine fettle when the sea comes into view.



SOMASS RIVER AT ALBERNI WITH MOUNT ARROWSMITH IN THE BACKGROUND



ON NANAIMO—ALBERNI ROAD, NEAR QUALICUM BEACH

There is not much to attract us in Nanaimo, although if a motorist made the trip during the herring fishing season it might be interesting to watch the progress of the industry. Even then the fish are only lightly cured, being what is known as "freshed" when sent to Vancouver en route to the Orient, where the fish meet a steady demand. Nanaimo is one of the oldest towns in British Columbia, having been established nearly 60 years ago. The discovery of coal in the district was mainly responsible for the birth of the city, although it is now taking a place as a distributing center for the east, south and central parts of the island. With a monthly payroll approximating \$400,000, Nanaimo feels prosperous. From the city the C. P. R. ferry Princess Patricia takes flight several times a day to Vancouver, making the trip of 38 miles across the gulf in less than 2 hours.

From Nanaimo to Alberni

From Nanaimo to Alberni, running north and west across the island for a distance of 60 miles, we had a variety of scenery. Standing on the Gulf of Georgia, the trip comes to an end on the banks of the Somass river, which joins the Alberni canal half a mile beyond. Forest and lake scenery of peerless grandeur and magnificence is enjoyed the whole length of this trip. We see the sublime beauty of the snow-capped mountains towering high above the light fleecy clouds, the translucent lakes lying many hundreds of feet below the level of the winding roads that seem at times to run sheer against the

huge rocky excrecences that jut from the mountain side. The survival of the fittest in an arboricultural sense is well exemplified in the trail-tracked woods, for the trees we see on every side are perfect specimens—real forest giants. The weaklings of the forest have been pushed in the background by the stronger, more sturdy monarchs, and we begin to realize the vastness of the timber wealth of British Columbia.

Old Scotch Poem Recalled

The quatrain of the Scottish patriot-poet express our feelings as we gaze on the wealth of lumber awaiting exploitation:

*"The meeting cliffs each deep-sunk glen divides,
The woods, wild scattered, clothe their ample sides;
The outstretching lake, embosomed 'mong the hills,
The eye with wonder and amazement fills."*

Five miles beyond Nanaimo we touch the pretty little town of Wellington, strongly reminiscent of the rural towns in the south of England. One of the most beautiful spots of the Nanaimo-Alberni run is reached as we come within sight of Nanoose Harbor. The harbor is an arm of the straits of Georgia, about half a mile wide and running inland perhaps $2\frac{1}{2}$ miles. From the motor road to the shore the descent is steep, but the view is well worth the trouble. The harbor itself is quaint and attractive.

A little farther on this route, some 30 miles from Nanaimo, the highway touches Qualicum, which is now being laid out as a summer resort. The Canadian Pacific Railway, working in conjunction with a

powerful English syndicate, is laying out the townsite and making arrangements for building a modern hotel catering to tourists. The site of the embryo city overlooks a fine, white, sandy beach, 2 miles in length, which forms the basis for the exploitation of Qualicum as a seaside resort. Being on the eastern portion of the island, it is shielded from the ocean winds by the chain of mountains which form the backbone of Vancouver island. The average temperature here is 40 degrees Fahrenheit in winter and 60 degrees Fahrenheit in summer, and more equitable than that of many parts of California, so popular with motorists.

Passing on our journey, we draw near to one of the prettiest

spots we have yet seen. Far below an elevated plateau lies Cameron lake—its waters intensely still, intensely blue. The road winds along the south shore, hugging closely the rocky sides of Mount Arrowsmith. At one point the road seems to pierce the very heart of the rugged mountain itself. Fine timber is seen on the run, improving as we near the head of the lake. For several miles we penetrate a forest tunnel. Huge timber giants rear their heads, seeming to pierce the very sky itself and obscuring the sunlight from the sprawling banks of mossy fern and flowers which impart to the landscape a harmonious touch of color and a benign fragrance. A cooling stream ripples its way down the steep mountain-side, to merge half a mile beyond in a rushing torrent which comes roaring down until it finds oblivion in the blue waters of the placid lake. Surely such a scene would move to enthusiasm even the most phlegmatic of motorists who may happen to see it.

Some Hills Encountered

About 2 miles from Alberni we have a fine opportunity of testing the hill-climbing capabilities of our motor. The highway winds in tortuous fashion up the steep sides of the mountain until it reaches the summit. A vast and glorious view precedes the descent, which must be made carefully. At once enjoyable and entrancing, to the uninitiated it is a trifle hazardous. Flanked by the towering mountain on one side, the road seems to slope away into the unknown—precipice like. While the road is safe and easily negotiated, all tourists should pay strict attention to their speed and steering at this,

the only hazardous point on the whole route.

At the head of the Alberni canal, extending along the banks of the Somass river on one side and joining the corporate limits of Port Alberni on the other, we come to the ancient city of Alberni. The approach to Alberni, the farthest west seafloor of the island, is a long, regular slope terminating in the heart of the city. A small and lively little city, Alberni was founded by some of the early pioneers in the eighties. It is by nature a farming center. As mentioned earlier in this article, Alberni boasts the distinction of being the Pacific coast terminus of the Canadian transcontinental motoring highway. A short distance away, Port Alberni has become established as a sister city and is coming to the front through its claim to be regarded as a freshwater shipping port having many advantages as a port of call for the largest coastwise steamers.

Alberni Canal Beautiful Stretch

The Alberni canal is a beautiful stretch of water, a natural waterway 24 miles in length,—almost cutting Vancouver island in two—averaging half a mile to 1 mile in width and 300 feet in depth. To all intents and purposes it is a continuation of Barclay sound.

Port Alberni is the nearest railway port in Canada to Australia, New Zealand and the Panama canal and the nearest coal port in the North Pacific to the latter. At present Port Alberni is used as a shipping point by extensive fishing and lumber interests. Already large canneries are located on the banks of the canal; the largest class of vessels can navigate its waters with a maximum of safety.



SCENE ON THE MALAHAT DRIVE OF THE ISLAND HIGHWAY

Port Alberni may be appropriately termed the hub of a magnificent scenic cycle. Sailing and motor boating on the lakes are pleasant diversions. The ascent of Mount Arrowsmith and other peaks in the neighborhood tempts the amateur mountaineer. At Long Beach and other spots along the canal are fine sandy bathing beaches, the objective point and rendezvous of many picnic parties.

It is not the resources of Alberni or the fertility of the soil that attract the tourist. These are attractions for the home-seeker. What appeals to the pleasure seeker is the marvelous and bewitching scenic beauties in the district.

On the canal such lovely spots as Effingham, Ucluelet harbor and Henderson lake will entice you. If you take an interest in fishery matters, you will inspect the whaling station at Sechant and the Vrildo-

nan canneries. Sproat lake is blossoming into an exclusive summer resort—perhaps not yet as popular as Atlantic City, but aiming in that direction. Delta and Buttle lakes are not yet reached by highways, but they are worth the trip.

From Victoria to Alberni

The trip from Victoria to Port Alberni is an event long to be remembered. While the trip offers no great attraction in the way of large cities, to the city man who seeks relief from monotony of skyscraper landscape and rest from the pursuit of the evanescent dollar, the trip will prove an all-satisfying and extremely pleasant experience. The solitary silence of the great forests, the spectacular beauty of the landscape, the rugged mountain peaks with outlines softly vignettied against the sky, are things one looks for in vain amid the bustling marts of trade.



STAMP RIVER FALLS, 7 MILES FROM ALBERNI ON BEAVER CREEK ROAD

Philadelphia Revives Road Race Talk

Quakers Feel There Is Good Chance to Put Fairmount Park Event on 1913 Calendar—Results of San Antonio Track Meet—Oldfield Cuts Mile Mark at Opening of New Bakersfield Oval—Isottas in Speedway Grind

PHILADELPHIA, Pa., April 26—Every one interested in the Fairmount Park road race, and that means very nearly every inhabitant in the city, is on the tip-toe of expectancy just now, for there is a possibility of the resumption of that event.

A committee from the Quaker City Motor Club, consisting of Fred C. Dunlap, ex-chief of the bureau of water; Common Councilman Frank Hardart and George M. Graham, waited on Mayor Blankenburg yesterday and urged him to reconsider his opposition to the event and to recommend to the Fairmount park commissioners that permission to use the park course be granted for the purpose of conducting a 200-mile road race under the same rules and regulations as governed the classic in the past.

The committee pointed to the fact that with the motorists working in co-operation with the municipal authorities, the possibilities of danger to both the participants and spectators were reduced to a minimum. As evidence of this it was shown that notwithstanding the enormous crowds that annually attended in the past, estimated at from 200,000 to 300,000 at each race, not a serious accident had ever occurred to dampen the enthusiasm.

The mayor, however, reiterated his antagonism to the race and stated that his position in the matter had undergone no change from last year, when, convinced by Dr. J. William White, who proposed the resolution that abolished the race, that members of the park commission would be personally responsible were any fatal accident to occur, he refused to sanction the event and voted to discontinue it.

But hope lies in the fact that at yesterday's conference Mr. Blankenburg said that while he would not stand sponsor for the race nor accept any responsibility in connection therewith, if councils were to pass a resolution requesting the park commission to grant the Quaker City Motor Club the necessary permission he would not oppose it. Accordingly Common Councilman Hardart will introduce such a resolution at the next meeting of city councils.

GRAND PRIZE CONDITIONS

New York, April 28—The Automobile Club of America has given out information relating to the conditions under which this year's—the fifth annual—grand prize will be carried out. The race will be over the Savannah course, 11.44 miles long, so that thirty-five laps will give a total run of 404.4 miles. Outside of the

grand prize trophy, there will be four money prizes, amounting to \$3,500, \$2,000, \$1,000 and \$500 respectively. Each car entered in the race must have a reverse gear driven by the motor, an exhaust outlet not directed toward the ground and an overall length not exceeding 146 inches. The cars will be started according to their order of entries.

The entry fees are as follows: A single car of one make, \$1,000; a two-team, the cars being of one make, \$1,500; three cars of the same make, \$1,750.

RESULTS AT SAN ANTONIO

San Antonio, Tex., April 25—Louis Disbrow, driving his Simplex Zip, in the first day of the local meet Wednesday, established a mark of 4:31 for 5 miles on a 3/4-mile track. The day was further featured by the painful injury of Joe Nikrent, who was stunned by a flying pebble and blindly drove into the ditch. He suffered a wrenched back and cuts about his head, but is not permanently injured, although he will be in the hospital some time.

Record attendance featured the opening day of the 2 days' meet, which is held as a feature of the spring fiesta and under the management of the San Antonio Automobile Club. A motor show with 150 cars of 1913 models is another feature of fiesta week. Wednesday's results were:

Exhibition drive by Disbrow in Jay-Eye-See; two laps, 1 1/2 miles. Time—1:21%; best lap, 3/4 mile, :40%.

Class E, non-stock, 300 cubic inches and under, 6 miles: Case Bullet, Joe Endicott, won; Pirate, Kilpatrick, second; Case Suffragette, H. Ulbrecht, third. Time—6:08%.

Class E, non-stock, local cars and drivers: Buick, Joe Briggs, won; Velle, Slim Kroeger, second. Time—7:27%.

Six miles, class E, non-stock, 450 cubic inches and under; first heat: Case, Nikrent, won; Jay-Eye-See Junior, Louis Disbrow, second; Case Tornado, Bill Endicott, third. Time—6:07%.

Second heat: Jay-Eye-See Junior, Disbrow, won; Case, Nikrent, second; Case Tornado, Endicott, third. Time—6:14%.

Special event—5-mile time trial for 3/4-mile track record of 4:37; Louis Disbrow in Simplex Zip covered distance in 4:31.

Class D, free-for-all, 6 miles: Simplex Zip, Disbrow, won; Case, Nikrent, second; Case Tornado, Endicott, third. Time—6:14%.

Australian pursuit race, limited to 10 miles: Disbrow, Case, won in ninth lap.

Free-for-all handicap, 9 miles: Called off when accident happened to Nikrent.

Second Day's Results

San Antonio, Tex., April 27—The driving of Louis Disbrow and Bill Endicott, especially in the two handicaps, featured the second and last day of the local motor meet during the spring fiesta. A big crowd saw the sport and the time was fairly fast. The speediest car in the field proved again to be the Simplex Zip, although Endicott's Case Bullet was a fair second. There were no mishaps and Joe

Endicott, injured Wednesday, was able to see the races from a touring car. Following is the summary:

Class E, non-stock, 450 inches and under, 6 miles: Case Tornado, Endicott, won; Case Bullet, Kilpatrick, second; Case Pirate, Newhouse, third. Time—6:22%.

One mile time trial for 3/4-mile track record: Disbrow in Simplex Zip, :52%. Oldfield's record, :50%.

Class D, free-for-all handicaps, 6 miles: Simplex Zip scratch, allowing handicap of one lap to others: Case Suffragette, Ulbrecht, won; Simplex, Disbrow, second; Case Pirate, Newhouse, third. Time—6:48%.

Exhibition drive by Disbrow in Jay-Eye-See, two laps with flying start. Time—1:23%.

Class C, division 3.C, 231-300, ten laps: Case Bullet, Endicott, won; Case Suffragette, Ulbrecht, second; Case Pirate, Newhouse, third. Time—8:38%.

Class D, free-for-all, five laps: Simplex, Disbrow, won; Jay-Eye-See, Jr., Kilpatrick, second; Case Bullet, Endicott, third. Time—4:16.

Novelty race, contestants to drive two laps, change a wheel or tire and drive two more to finish: Disbrow, Jay-Eye-See, Jr., won. He was equipped with wire wheels and made the change in 28 seconds. The others had racing demountable rims.

Match race, five laps: Disbrow, Jay-Eye-See, Jr., beat Endicott in Tornado. Time—4:09%.

Class D, free-for-all, twenty-five laps: Simplex gave others 1 minute 42 seconds start. Jay-Eye-See, Jr., Kilpatrick, won; Simplex, Disbrow, second; Case Pirate, Newhouse, third. Time—19:35%.

OLDFIELD LOWERS MILE RECORD

Los Angeles, Cal., April 28—Special telegram—The new Bakersfield mile track, constructed for the racing of motor cars at a cost of \$100,000, was formally opened Saturday and Sunday. A crowd of 20,000 people gathered each day. Teddy Tetzlaff and Barney Oldfield were the star attractions.

Sunday Oldfield in his Christie set a new record for a mile on a mile dirt track by circling the course in 46 2/3 seconds. The mile was electrically timed and the report will be forwarded to the American Automobile Association.

Tetzlaff in the Fiat went 5 miles in 4:22%. The 25-mile free-for-all for \$2,000 cash prize was won by Tetzlaff in a 120-horsepower Fiat in 23:38. Cooper in a Stutz was second and Hill in a Fiat third. The 10-mile race was won by Nikrent in a Buick.

ISOTTAS FOR INDIANAPOLIS

New York, April 28—Three Isotta-Fraschini 75-horsepower cars, which are to compete in the 500-mile race at Indianapolis on May 30, will be shipped May 1 from Havre, according to word brought back to this country by Ray Gilhooly, who has just returned from the Isotta factory at Milan. The nominator of only one of the three machines has been made public thus far. William Ziegler, Jr., will enter one of the three. Harry F. Grant has been signed to drive one of the three machines. Arrangements have about been completed with Teddy Tetzlaff to take the wheel

of another of the fast Italian cars. Gilhooly will be the driver of the third machine.

VANDERBILT CUP ECHO

New York, April 26—The appellate division of the supreme court here affirmed the decision of the court, in the case of Thomas Muller against the Pope-Hartford Auto Co., which was the local agent of the Pope Mfg. Co. in 1910. The plaintiff had been awarded \$22,500 damages for injuries sustained at the 1910 Vanderbilt cup race, when a Pope racer driven by Fleming ran amuck and cut off Muller's leg. The Pope company had appealed, asking for a new trial, which motion was unanimously denied and a decision to this effect rendered by the court, without giving an opinion.

TULSA IN SPEEDWAY RACE

Indianapolis, Ind., April 29—One more entry for the 500-mile race was booked today—a Tulsa, nominated by Carden Green and J. B. Levy, of Broken Arrow, Okla., oil operators, who have nominated George H. Clark as driver. Clark drove W. H. Bertrand's Mercedes last year. It is understood the three Isotta entries are in the mails. The entry list closes May 1.

English Talk Fuel Situation

Britons Fuel Supply Is Controlled by Powerful Combine

LONDON, April 18—The fuel situation is growing more acute every week in this country. There is a strong feeling here that a combine controls the supply of motor fuels in England. It is a rather significant fact that almost simultaneously with the publication in America of facts concerning the new fuel, Motor Spirits, that the Shell interests here announced that they would in future furnish two grades of fuel. They always have supplied a heavy spirit named Crown which was not used by private car owners to any great extent, but by buses and cabs. Then they announced Shell I and Shell II, taking the opportunity to put Shell I up 4 cents a gallon, making it 43, and Shell II at 39. The Anglo-American people followed exactly 1 week afterwards, taking the same course and putting up the price.

Motorists on this side feel very strongly that they are in the grip of a trust and that there will be no relief until there is a strong and determined competition up against them.

English imports of motor fuel are rising enormously. During the 3 months ending March 31, the country imported no fewer than 23,171,471 gallons, as against 14,903,951 gallons for the same period last year.

There are campaigns on here for home-produced fuel, and the joint committee representing the Royal Automobile Club, the Automobile Association and the trade society now is investigating the whole question.

Every effort is being made at present to create a big demand for benzole, which is giving excellent results. It gives more miles to the gallon than petrol or gasoline, as Americans term it, and has no deleterious effect on the engine. Great Britain is producing millions of gallons of benzole annually, but the irony of the situation is that the bulk of it is exported and used in France as a motor fuel. We want to create such a home demand that it will be possible to keep the stuff for use here, but even so, the supply is of course infinitesimal compared with the growing demand. Our coke oven plants at the mines only produce 1½-2 gallons of benzole to each ton of coal treated, plus the various by-products, but investigations show that with a Del Monte system this can be increased from 6 to 7 gallons per ton of ordinary coal, and to as high as 20 gallons per ton from channel coal. It is further claimed by this process that the residue after treatment is a thoroughly efficient smokeless fuel.

Notable scientists here regard this treatment of coal as the one thing to solve the home-produced liquid fuel problem and also the smoke nuisance. It is not certain that the Del Monte process is the one and only means to this end, but any system that will give a supply of motor fuel will be doing excellent service.

In England we have no faith in alcohol, as so many of our people are too conservative, and certainly will not give ear to anything that necessitates a change of engine design.

It is threatened at present that petrol, or gasoline, will go up to 50 cents per gallon by the summer. Benzole can be purchased for 33 cents per gallon at present.

INTERESTED IN TRADE BODY IDEA

New York, April 28—The movement to organize a national association of motor car dealers is gaining headway. Fifteen or twenty trade associations in the east are expected to send representatives to this city for a meeting the end of the week when the possibility of such an organization will be gone into and the matter definitely decided whether a call will be issued for a national convention to be held at Indianapolis, Ind., May 29 for the purpose of perfecting such an organization.

WARREN QUITTING HAYNES

Kokomo, Ind., April 26—C. B. Warren, general manager of the Haynes Automobile Co., Kokomo, Ind., has tendered his resignation, which takes effect June 1. He will be succeeded by A. G. Sieberling.

PREST-O-LITE REFILLERS FINED

New York, April 28—Justice Spiegelberg in the municipal court of the city of New York today rendered a decision in the case of the Prest-O-Lite Co. against two dealers who had filled Prest-O-Lite tanks with Searchlight gas. The judge ruled

that such a procedure, namely the filling of a tank bearing the name Prest-o-Lite with other than Prest-o-Lite, gas, or the selling of a thus filled tank, constitutes a violation of the statute of the New York state business law directed against refilling receptacles which bear registered trademarks. Such a violation carries a penalty of \$100 in each case, to be paid to the owner of the trademark. Both Smith-Haines and Norman Brickner, the defendants, were sentenced to pay this penalty. Louis Lande, attorney for the defendant, stated that the case will come up before the appellate term of the supreme court on June 2 and that it will be carried to the highest possible instance.

THREE DECLARE DIVIDENDS

New York, April 26—Three companies have declared stock dividends during the past week. The Chicago Pneumatic Tool Co. will pay 1 per cent on its common stock on April 25, the Russell Motor Car Co. will pay 1¼ per cent, the regular quarterly dividend, on May 1, and the Vacuum Oil Co. 3 per cent, payable on May 15; the last dividend declared by the Vacuum company was 3 per cent, paid on October 31, 1912.

New Lozier Chief Picked

J. M. Gilbert, Formerly United States Tire Man, Elected President

New York, April 30—Special telegram—Joseph M. Gilbert, who last week resigned as general manager of the United States Tire Co., was yesterday elected president of the Lozier company. Harry Lozier was elected vice-president of the company; Fred Gies, secretary and assistant treasurer, and N. R. Sultes, treasurer.


Mr. Sultes was connected with Morgan & Wright for 20 years, being president of that concern for 10 years. When the United States Tire Co. was formed, March, 1911, Mr. Sultes became assistant treasurer.

No other changes have been made in the Lozier organization. J. G. Perrin remains as engineer and Works Manager Pollard will continue in that capacity. The output of the factory is to be largely increased.

Paul Smith, who was appointed sales manager a few months ago, will continue in the capacity. No announcements have been made of Mr. Gilbert's successor as manager of the United States Tire Co.

STILL FIGHTING PRICE-CUTTING

Washington, D. C., April 26—The manufacturers of Sanatogen, a medicinal preparation, and of the Gillette safety razor, have combined in their fight against price-cutting dealers and have filed a brief with the United State supreme court in which the side of the patent owner is set forth and conclusions are drawn to make clear his right of fixing retail prices.



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Self-Starters for Trucks

DURING the recent shows there was a perceptible effort on the part of certain truck manufacturers to discourage the self-starter movement so far as applying it to trucks was concerned. The general reason advanced was that the simpler the truck was when placed in the hands of the driver, the better would be its performance, and that the more devices and accessories it carried, the greater would be the opportunity for the driver tinkering with these, and consequently the greater liability of trouble.

ALL of these reasons are well taken, but the manufacturer forgets the one important fact that everything possible should be done to save the energies of the driver, which is particularly the case in vehicles of 1,500 pounds capacity used in parcel delivery work where the deliveries per day will not infrequently exceed the 100 mark. In such cases the driver expends a great deal of energy cranking the motor, not to mention the loss of time. The serious aspect of this expenditure of energy is that the energy so consumed cannot be expended in the regular delivery work; in other words, that driver who has to expend a goodly fraction of his energy in cranking the motor will not make as many deliveries per day as the driver not having to so consume his energy; and, further, that the driver who can conserve his energies by using a self-starter will be more apt to give better attention to his truck than the driver without a starter. The fresher, freer from fatigue the driver is, the more attention will he give to his car, and consequently the self-starter becomes an asset to the truck.

WITH the improvement that starters are receiving at present, there is not any reason why satisfactory ones for the truck driver cannot be produced. It is true the work on a starter in such service is ten times greater than that in a passenger car, and it will be up to the starter manufacturer and battery builders to cope with these extreme conditions.

THE fact that starters are desirable for one type of motor truck does not necessarily mean they are desirable for all types. The truck used in transfer work between a store and its distributing warehouses, or between the depot and the wholesale warehouses, has not that requirement for a starter that the vehicle in the house-to-house service has. It is a moral certainty that when the starter movement takes hold of one department of the truck industry its influence will be felt in all of the others.

EVERY undertaking which aims at keeping abreast of current requirements must be prepared to spend some time and money in experiments, investigations, research and the like, and there can be no question that, on the one hand, in the inception of such work, in its arrangement, and in its operation the presence of the mind scientifically trained is essential, and that for practical work, on the other hand, the scientists employed should also be practical in their methods of approaching and handling the investigations or research and in the application of the results presented.

THIS extract from the address of H. Frederick Donaldson, president of the Institution of Mechanical Engineers, Great Britain, puts in exquisite form the old adage of combining the practical with the theoretical—a maxim which has been sadly overlooked in the motor car industry in many departments up to the present time.

DURING the last 5 years we have had many examples of the absence of the scientifically-trained mind. Many models of cars have been thrust upon the market in which the whims of some utterly unfitted so-called engineer have been pushed into the public eye. These constructions have been entirely at variance with scientific training and have shown an utter lack of combining rational practice with scientific knowledge.

OUR manufacturers are open to criticism in not grappling well in advance with not a few questions that have been presented to the industry by an anxious public, but thanks to our awakened organizations, there is a disposition at present to camp on the outskirts and scan the future for conditions that will arise, so that they may be properly handled before an exigency is precipitated. An excellent example of this is the present handling of the fuel situation, in which a committee has been appointed to have conducted tests to prove the relative value of kerosene, Motor Spirits and the various other grades of fuels that are now put before the buyer.

IT is always difficult to combine the scientific with the practical. Our makers have failed to do it because they did not have to do it. Production was their only aim. Filling orders was their great ambition. That was all right while there were plenty of orders to fill, but such a regime did little to cultivate a healthy spirit, a healthy engineering status and a robust factory atmosphere. Retracing your steps is never good policy, and generally indicates a lack of scientific research and a broad grasp of what the future will unfold.

WE have had too many cars designed by graduates from the workshop. This class of engineer is worthy of every recognition. He has in him the stamina that wins in the end, but, unfortunately, many of his actions have been away from the straight and certain path that is the quickest road to the desired goal. He has lacked the mind scientifically trained; he has also lacked the view of the scientist.

WE have also had with us representatives of the other side, namely, the mind scientifically trained, but not practically. Of the two, the latter has been the more unfortunate during the last 10 years. It is deplorable that our 150 manufacturing companies did not have, 5 years ago, a higher average caliber of engineering force—a force combining the scientific with the practical. It is further unfortunate that not until the last 2 or 3 years several of our factories failed to create engineering departments in which these two parties are represented. Both are needed in order to obtain the best results. It is very difficult to find both in one and the same person, consequently the only course of attainment rested with the engineering board where both parties could be represented and over which the factory executive sat as arbiter.

THIS desultory course pursued by many factories has been expensive. It has cost the car owner much. He has bought his annual models, which might have been avoided had more far-sighted engineering policies been followed. These annual models have been deplorably expensive to the manufacturer. They have largely given rise to the second-hand bugaboo, which is today one of the serious situations in the industry.

Under the Motor Microscope

Short Stories with Humorous Angles



How the Boss "Cheated"

ALTHOUGH colonel of the First Illinois Cavalry and as imposing a figure on horseback as was the imperial Napoleon or is the venerable William F. Cody, Milton J. Foreman is an enthusiastic motorist, one of Chicago's petrol pioneers who is undecided which of two odors he prefers,—the smell of gunpowder or the fumes of gasoline.

Colonel Foreman purchased a car from Jack Banta, the Chicago Locomobile branch manager. Needing a chauffeur, the militant cavalry officer, whose sharp commands had sent his troopers in many triumphant charges against the enemy, called on Banta to furnish him with a driver. About 1 month after Foreman surrendered the wheel to the youthful expert, Banta met the yawning, heavy-eyed chauffeur on the street.

"How do you like that job I got you?" the Locomobile man asked the driver.

"That ain't no job," was the chauffeur's reply, "it's a curse you wished on me and I'm going to quit. Say, I don't know what sleep is any more. I meet myself goin' into the garage when I'm comin' out. The boss goes down to the office at 7 o'clock in the morning and ain't ready to call it a day's work until 2 or 3 hours after midnight. I'm through."

Banta saw it was up to him to use persuasion or Colonel Foreman would be in the market for another driver.

"You aren't going to let a middle-aged man like him get your goat, are you?" Banta asked. "If he can stand it, you can too, can't you? What's a few hours sleep to a strong young fellow like you? Stick it out. Don't quit. Show him he can't go too fast a clip for you."

The chauffeur was greatly impressed and decided at least to defer sending in his resignation. Banta patted himself on the back and looked around for the laurels Machiavelli put aside when the great Italian diplomat journeyed to that bourne from which no man returneth.

Had Banta found the garland, the wreath would have proved many sizes too large for 1 month later he was forced to admit his persuasion was for naught.

"I'm through, I tell you, I'm through,"



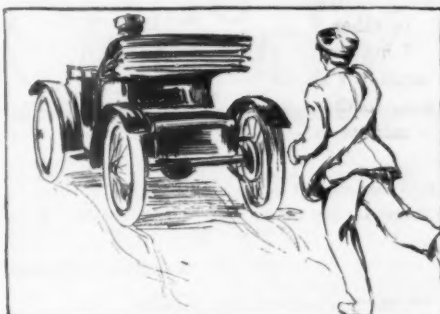
"He's sleepin' afternoons at the office"

the chauffeur shrieked the next time he saw Banta. "I would have stuck it out but I found the boss was cheating. He's sleepin' afternoons at the office."

Speed Graphically Described

Ira M. Cobe, former president of the Chicago Automobile Club and a prominent capitalist of the western metropolis, was largely responsible for Colonel Foreman's conversion to motoring and before the defender of the nation's honor finally accepted the gasoline gospel, performed some splendid missionary work in a prehistoric electric vehicle that had all the faults, but none of the charms of the coquette.

Cobe's repeated invitations of "Come, take a ride, Foreman," were most sincere in intent and most graciously accepted, but the colonel discovered that it was one thing to extend an invitation and another thing to "make good" in the dark ages



"Run behind the machine with one tire draped gracefully over his shoulder"

of the sport. Cobe rode. Foreman practiced mounting and dismounting by hopping in and out of the car to change tires. He became so expert in this labor of reciprocity that he could run behind the machine with one tire draped gracefully over his shoulder and change another while the car grapevined down Michigan avenue.

"Only a Cubist with over-developed powers of imagination could have thought Cobe's electric both fast and reliable," Foreman said in paying tribute to the antique. "Why one April day we started out to ride to the White Sox ball park to witness the opening game of the season and we never got there until the final engagement in the series for the world's championship had been played. Yes, it was a fast car,—fast black."

Pride Goeth Before a Fall

Motor cars were about as common in Chicago 12 years ago as sane suffragettes are in London today and Meyer was as haughty as a peacock or Belasco star in the possession of a vehicle that moved without the assistance of horses—sometimes.

One balmy Sunday in the early summer he took the family pet out for an airing along Sheridan road, Chicago. The ride promised to be a tour of triumph. Smartly dressed boulevardiers stopped short their promenade to gaze upon the racuous rig and comment in awe-suppressed whispers. Button after button on the proud owner's waistcoat gave way as his chest measurement gradually increased. He imagined he heard the bravos of an envious populace ringing in his ears.

He snuffed the fresh, exhilarating perfume of budding trees and fragrant flowers until the odor of burning varnish was wafted to his sensitive nostrils and he made an investigation in time to prevent a tragedy. The rear of the car was aflame. He then realized that the fire, and not the grandeur of his equipage, had attracted the notice of passersby.

But this is only the first chapter in the biography of Meyer's first car which he traded off for a lot on the west side that the owner claimed was valued at \$750. It was an unsight and unseen trade as far as Meyer was concerned. He never looked at the piece of real estate to find if it was under water or not.

Three years ago Meyer was invited to meet a desk sergeant at police headquarters after being stopped by a motorcycle officer for speeding.

"Have you any property?" was the first question asked by the desk sergeant. "Not in the city," was Meyer's reply.

"Then you'll have to get somebody to go your bail, or go to a cell," the sergeant said.

This jarred Meyer's memory.

"Come to think of it, I have some real estate on the west side," he jubilantly cried. "Will you accept that as bond for my appearance in court?"

The sergeant would. He was as gullible as the offender who stood at the rail. Neither knew to this day whether the lot is a myth or a reality.

Meyer forgot he had a lot on the west side except when the assessor's bill had to be paid. He did not consider it a very desirable piece of property. He regarded it as grazing ground for a white elephant.



"The rear of the car was aflame"

Motor Happenings in Legislative World

Massachusetts Feels it Will Defeat Obnoxious Truck Bill

BOSTON, MASS., April 28—There is a feeling now that the proposed legislation in Massachusetts to tax motor trucks \$5 per ton will be defeated. The impression prevails that the highway commission was responsible for giving the members of the committee on roads and bridges, several of whom are new members on the committee this year, and consequently not familiar with motor legislation, a wrong idea that led the committee to report the bill.

From what some of the members of the legislature in the senate and house have stated the past few days there is a feeling that the highway commission would make better progress by sticking to its executive duties and letting legislative matters alone. A member of one of the other committees said that it seemed strange that commissioners of other departments, when appearing before his committee, gave such information as was asked by the committee while the highway commission came pretty close to the lobbyist class in engineering legislation. So it seems now as if the thing has been overdone.

The state house was fairly seething with opposition last week when the motor interests began to get busy. Constituents began to let the members of the legislature hear from them. There was a genuine surprised awakening for the lawmakers. The motor interests, however, are watching every move so that they may not be checkmated in any way. Their committee has been scouting, getting some information from different angles so that they could work to good advantage.

It was learned that the motor truck increase is one of the measures that the republican party intended to push across among others when its legislative members had a meeting recently. So, notice was served on the republican leaders that the party will be held responsible for what happens. The democratic party does not favor it, and from the political viewpoint it begins to look like another of the little jokes of Governor Foss that will prove a jolt to the G. O. P. next fall.

The motor interests are united now so that next fall literature will be sent to all districts throughout the state to every voter giving a resume of what has happened during the past few years.

The meeting of the motor committee last Thursday brought together a large gathering of men identified with different lines, and it was the unanimous sentiment to make one fight now to bury the scheme to tax the commercial truck industry. John B. Sullivan, Jr., was

named to take charge of the hearing before the legislative committee, and he plans to have one man to represent each different phase of the industry speak on that line so that there will be no muddled opinions created by people getting up indiscriminately and talking. There will be another meeting this week to further plans along this line.

The committee on roads and bridges left yesterday for a tour to the western part of the state, and the suggestion was made to one of its members, Senator Fitzgerald, that the committee seek out the road where horse-drawn logging teams slide down hill using a big log as a brake, tearing up the road so badly that the highway commission is in despair trying to repair it. The senator was told to

take a look at that road and note what horse-drawn vehicles can do to roads so that motor vehicles may not get all the blame.

It is probable that when the committee is up in the western part of the state it may also get an echo of the opposition to the truck bill from there. Meanwhile, the bill on weights, speed, etc., on motor trucks that was to be shot along after the fee bill got well under way toward enactment is being held by the committee, and if the compromise measure agreed upon on that bill is not reported there will be another fight.

SOUTH DAKOTA'S NEW LAW

Pierre, S. D., April 26—The new motor law for the state has some peculiar provisions which place the instrument in a class by itself. It becomes operative July 1. The license fee from July 1 to December 31 is to be \$3. Thereafter the annual fee shall be \$6 for motor cars and \$2 for each motorcycle or motor bicycle. If a vehicle shall have been licensed for 5 successive years the fee is to be one-half the regular rate. Vehicles registered any time between July 1 and January 1, 1914, will cost the owner the full \$3 each for tags.

All fees received under the act are to be divided as follows: For 1913, 75 per cent to the county vehicle road fund and 25 per cent to the secretary of state who will pay expenses of the work and turn the remainder into the state general fund at the end of the year. For 1914 and successive years the proportion of distribution is to be 87½ per cent to the county and 12½ per cent to the state.

The law specifies distribution of the county vehicle road fund from registration as follows: Only for grading, crowning, draining, graveling, or macadamizing of public highways outside limits of cities and towns, and for the building of permanent culverts on such highways which shall be constructed of metal, concrete or stone. The fund is to be under control of the county commissioners, but the survey and details of the road work must be filed with the county auditor for record.

Usual speed and signal requirements are included in the law, excess of 25 miles an hour being presumptive evidence of fast driving in case of an accident. When a passing animal is seriously frightened the owner of the motor vehicle must stop his engine. Drivers must be above 15 years old, unless accompanied by the car owner. A maximum of \$500 or imprisonment of not more than 2 years is provided for first conviction on the charge of leaving an injured person without giving name



CONTESTS

*May 5-8—Truck reliability of Washington Post, Washington, D. C.

May 11-12—Targa Florio road race, Sicily.

May 14-15—West Hudson and Catskill tour.

May 29-30—Interclub reliability, Chicago Motor Club-Illinois A. C.

*May 30—Indianapolis speedway meet.

*June 7—Quaker City Motor Club and motor clubs of Delaware county interclub run; Philadelphia, Pa.

June 12-13—Interclub match, Chicago Athletic Association-Chicago Automobile Club.

June 16-18—Reliability, Columbus Automobile Club, Columbus, O.

June 19—Algonquin hill climb, Algonquin, Ill.

*June 25-28—Chicago Automobile Club reliability to Boston, Mass.

June—Tour Iowa State Automobile Association.

July 1—Indianapolis to Pacific coast, tour; promoted by Indiana Automobile Manufacturers' Association.

July 1-16—Motor plow competition, Winnipeg, Can.

July 4—Columbus, O., 200-mile track race.

July 4—Track meet, Taylor, Tex.

*July 4-5—Track meet, Sioux City Auto Club.

July 5-6—Road race, Tacoma, Wash.

July 12—French grand prix.

*July 11-19—A. A. A. endurance run, Minneapolis to Glacier Park, Mont.

*July 27-28—Tacoma, Wash., road race.

August 29-30—Elgin road races.

August 30-September 6—Reliability run, Chicago Motor Club.

September 1—200-mile track race, Columbus, O.

September 21—French light-car road race, Boulogne.

September 25—Tourist trophy stock-car road race, Isle of Man, Great Britain.

October 4—Start of Chicago Motor Club's around Lake Michigan reliability.

*November 24—Vanderbilt road race at Savannah, Ga.

†November 27—Savannah grand prix.

MEETINGS

May 20-21—Convention of Electric manufacturers in Boston, Mass.

June 5-7—Mid-summer meeting S. A. E., Detroit.

June 23-25—International road congress, London, Eng.

*Sanctioned by A. A. A.

†Sanctioned by A. C. A.

and address, or in case a police officer is not there of failing to report to a police or peace officer. Upon conviction a second time for this offense or of the misdemeanor of being intoxicated while driving the charge is felony, and the penalty is imprisonment from 1 to 5 years. Upon recommendation of the trial court which must report all convictions, the secretary of state may revoke the license of the operator.

NEW YORK LEGISLATIVE MATTERS

Albany, N. Y., April 29—Proposed motor legislation is moving slowly these days. Senator Loren H. White, chairman of the internal affairs committee of the senate, which is handling all of the legislation, says that there will be little if any effected this session. Chairman White expects that his bill authorizing three committeemen of the state to confer with other committeemen from Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Pennsylvania, Delaware and Maryland, to obtain uniform motor laws will be passed.

Chairman White expects that legislation will be enacted giving Secretary of State May power to revoke a license for cause; and further that an amendment will be passed which would license all operators without fee or examination.

A public hearing was held on April 23 and at this the secretary of state was willing to give in on all questions of legislation excepting two. These were: 1—License owners without an examination and without a fee; 2—he wants power to revoke a license of either chauffeur or owner for any cause, a clause which would give him more power than the czar of Russia, a clause which would give him power to revoke a license if the tail light happened to be blown out by the wind.

At the hearing Frank D. Lyon, secretary of the New York State Automobile Association, favored levying a wheel tax or issuing licenses to all vehicles using the public thoroughfares with the exceptions of vehicles of the farmer used by the farmer for his own direct and personal benefit in delivering his product to the market, this exemption being urged because the farmer already pays a direct tax upon his land property for the purpose of maintaining the highways and bridges of the state.

TAX OUTLOOK IN KANSAS

Topeka, Kan., April 26—The new Kansas state tax will yield in round numbers \$120,000 a year for use on the rural highways of the state, according to the estimates of Secretary of State Charles H. Sessions. The law becomes effective July 1, next, and it is expected that most of the money will be in the hands of the county treasurers before that time.

The tax amounts to \$5 a year on cars and \$2.50 a year on motorcycles. Of this

amount the secretary of state, under whose direction the administration of the law is placed, receives 75 cents on car licenses and 50 cents on motorcycle licenses for the expenses of administration, providing number tags, etc., and the clerical work required in registering the machines.

Sessions has made a poll of the state and has learned that there are about 26,000 cars in the state and about 4,500 motorcycles. A total of \$130,000, therefore, will be collected from car owners, \$110,500 of which goes into the road funds. The motorcycle tax will aggregate about \$11,250, of which \$9,000 goes into the road funds. The total amount which will go to the state treasury to be used in the administration of the law is \$21,750 approximately.

Dealers say there never has been a year when the prospect of business was better than it is this year. Much of the patronage in Kansas is from the prosperous farmers, and when the farmers are making good crops they not only buy machines, but they are disposed to buy second and third cars, and better and better ones.

Packard Plans Engine Test Six-Cylinder Motor to Be Run 200 Hours at A. C. A., New York

NEW YORK, April 28—Special telegram—A 200-hour motor test on a 1913 six-cylinder Packard motor is to be made at the testing laboratory of the Automobile club of America in this city some time between May 1 and 5. The test already has been arranged for by the Packard Motor Car Co. of Detroit, but it will be conducted by the testing corps of the laboratory under the direction of Herbert Chase, laboratory engineer.

The motor will be run on a block for this time and probably 300 hours with the throttle wide open and operating at a constant speed of 1,200 revolutions per minute. The power output will be measured by the club's electrical dynamometer and records will be taken of fuel and oil consumed, together with other data.

The real object of the test will be to demonstrate the durability of Packard motors under prolonged and exacting service and is proposed to show the material and workmanship of these motors. Visitors will be admitted to the laboratory at any time during the test by securing a pass from the laboratory office.

At the conclusion of the test full reports will be published. This test, if successful, will be the longest official performance of its kind ever recorded in this country if not the world, and will exceed in duration the test of the Knight sleeve motor made by the Royal Automobile Club of Great Britain in 1909. The test will continue day and night without interruption, the motor being under the constant supervision of the laboratory staff working the three 8-hour shifts.

Kansas raised a bumper crop last year, and the farmers secured good prices for all their products. The prospects so far this year are for a still better crop, and the resultant prosperity already is in the atmosphere. The season is said to be opening in fine shape.

PARCEL POST BIDS VOID

Washington, D. C., April 30—Special telegram—Contracts for the purchase of more than \$100,000 worth of motor cars for the parcel post were declared void today by the comptroller of the treasury. The award of these contracts was the last official act, March 3, of Postmaster-General Hitchcock. New bids will have to be advertised for and accepted.

Postmaster-General Hitchcock made the award on the theory that he was entitled to advertise for bids and award the contract by provisions of the Parcel Post act of August 24, 1912, which permitted the expenditure of money for special equipment; but motor cars are not special equipment for the postoffice department in the opinion of the comptroller of the treasury.

"Having no authority to advertise for bids," says the comptroller in his opinion. "He had no authority to award contracts and the bidders cannot be held to their bids. That they would like to be held and would furnish promptly the 100 motor cars concerned makes no difference."

Postmaster-General Burleson is advised by the comptroller that the whole business will have to be undertaken anew. Authority now exists because the deficiency act of March 4, passed 1 day after Mr. Hitchcock made the award, does grant such authority. The bids now thrown out were advertised for January 20.

COLORADO NOW HAS MOTOR LAW

Denver, Colo., April 25—Colorado's first law for a state license tax upon motor vehicles has been signed by Governor Ammons, and it is estimated that it will add in the neighborhood of \$40,000 annually to the state road fund. If the measure is not subjected to a referendum vote of the people it will go into effect the middle of July.

The law provides for a yearly license tax of \$2.50 for cars of less than 20 horsepower, \$5 for 20 to 40; \$10 for more than 40, and \$2 for motorcycles. It also requires all paid operators to secure a license costing \$2.

NEW YORK LOWERING FEES

New York, April 29—Special telegram—At the hearing this afternoon before the committee of international affairs of the state on new motor legislation it was agreed that the license fee for chauffeurs will be reduced from \$5 to \$2 and that there will not be any fee for renewal. Heretofore there had been a fee of \$2 for renewal.



MICHIGAN AVENUE, CHICAGO, AS IT LOOKS WITH MOTOR CARS PARKED THE NEW WAY

Chicago Tries New System of Parking Cars on Boulevard

CHICAGO, April 30—Chicago has taken the center of the motoring stage this week and the spotlight has been focused on the metropolis of the west from at least four angles.

On Monday, the traffic policemen, acting under instructions from the south park commissioners, shooed all motor cars away from the curbs on either side of Michigan boulevard from Randolph to Twelfth streets and ordered their drivers to park their machines in the middle of the popular driveway. Under the new rule, the cars face east and west instead of north and south, the way the boulevard runs, and drivers must park their machines so that they can join the steady stream of traffic without turning around.

This innovation was adopted as a means of relieving congested traffic and to give pedestrians an unobstructed view of the boulevard. Cars may be left there all day. According to J. F. Foster, superintendent of the south park commission, twice as many cars can be parked in the middle of the street as along the curbs.

On the afternoon of the same day members of the Chicago Automobile Trade Association rose in rebellion against the wheel tax which became due May 1 and decided to test the validity of this ordinance as well as several other measures which they claim are for the persecution of the motorist.

For the purpose of testing the wheel tax ordinance, eight members volunteered to act as martyrs and pledged themselves not to pay the alleged exorbitant fees. It is expected that they will be arrested, whereupon the association will sue for an in-

junction restraining the city from collecting a wheel tax from any owner of motor car using the streets of Chicago.

The Chicago Automobile Trade Association also will attempt to secure legislation at Springfield which will prevent municipalities from passing ordinances that are in violation of the state motor laws.

Eight hours after the C. A. T. A. members threw down the gauntlet to city officials, two bills, regulating motoring, were introduced in the council and referred to the judiciary committee. The first ordinance, if passed, will force the motorist to rig out his car like a ship and carry red and green lights on the front of his machine. The other ordinance requires all motor trucks to be equipped with fenders.

In his annual message to the aldermen, Mayor Carter H. Harrison assailed motor car owners as indifferent to the comfort and safety of others and as habitual law-breakers. Among the laws he said the motorists fracture at almost every opportunity are those governing speed, the cutting out of mufflers, unnecessary smoking and noise, the use of dazzling headlights and the ordinance requiring cars to stop behind street cars discharging or receiving passengers and to pass cars only on the right hand side.

He charged that many motor car drivers run away after injuring pedestrians, that they hide or disguise the number license plates and that few comply with the law concerning headlights. He denied the charges of unfairness repeatedly brought against the administration by owners, dealers and officials of motor clubs.

Acting on the claim of Homer J. Tice, chairman of the good roads committee of

the Illinois legislature, that the state motor vehicle act is unconstitutional, many motor car owners have demanded that their license money be refunded. They had little satisfaction in return for labor spent in making such a demand. The secretary of state has prepared a form letter stating that the law is still in force, since the supreme court has not invalidated it, and that fees must be paid as heretofore.

WOLF BUYS CLARK PLANT

Indianapolis, Ind., April 26—Interests headed by Maurice Wolf of Chicago have bought the plant of the Clark Motor Car Co. at Shelbyville, Ind., subject to the approval of the court. The sale was made by Herbert C. Jones, receiver for the company. The personal property was sold for the appraised value of \$11,219, while the real estate will be taken at appraised value by the Citizens Industrial Club which held a lien against it for \$26,000. Mr. Wolf will organize a new company which will continue the manufacture of the Clark car in Shelbyville, building two models, one of 30 horsepower and the other of 40.

NEW ENGINE COMPANY FORMED

Chicago, April 28—The Beller Slide Valve Motor Co., Chicago, has been incorporated for the purpose of manufacturing a non-poppet motor. With a capital of \$20,000 the company will market a motor with sliding valves. The inventor is Esten B. Beeler. Facilities for the building of the engine are not yet at hand, but it is expected that a factory site will be selected shortly.

Tries Out Motor Mail Rigs

Omaha Postmaster Finds They Give Better Results Than Horses

OMAHA, Neb., April 28—The Omaha postoffice, for the purpose of finding out whether the collection service of six wagons can be cared for by two motor trucks, had several local dealers make a test trip with their respective cars last week. This was the first time that a motor car has been used in the mail collection service in Omaha.

The first car to make the test trip was a delivery body Studebaker 20, which was driven by C. D. Brown for the E. R. Wilson Automobile Co. Assistant Superintendent of Mails George J. Kleffner, accompanied the motor on its rounds. The first trip included fifty-four stops, and the 3.8 miles recorded by the speedometer was made in 43 minutes, while the wagon collection service, the same trip required 1

hour and 15 minutes, or nearly double the time.

In a Hupmobile 32, with W. L. Huffman of the W. L. Huffman Automobile Co. driving, the second motor collection test trip was made the day following the try-out of the Studebaker. The record was again lowered on that day, when the machine, making fifty-seven stops, and traveling a distance of 3.8 miles, completed the trip in 37 minutes, $\frac{1}{2}$ minute less than half the time required to make the collection with a horse and wagon under the old system.

The day after the Hupmobile had made the trip to try out the efficiency of the motor trucks, a Ford car driven by W. H. Schmelzel, assistant manager of the local company, made the four trips, an aggregate of 10.7 miles, with 154 stops for mail collection in a total time of 87.5 minutes, which was 21 minutes less than the next car. The performance, made under the same weather conditions, with the same timekeeper and the same collection mail carrier, was a marvel to the postal authorities and will be a strong argument in favor of the installation of motor equipment to displace the present horse-drawn vehicles used in the mail collection service. Of the four routes traveled by George J. Kleffner in motor cars the Ford made the best time. Following is the official time given out by Mr. Kleffner after the trials:

Route 73, 1.4 miles: Wagon time, 54 minutes; Ford time, 21 $\frac{1}{2}$ minutes; Hupmobile time, 25 minutes; Studebaker time, 29 minutes.
Route 60, 2.3 miles: Wagon time, 45 minutes; Ford time, 19 minutes; Hupmobile time, 21 $\frac{1}{2}$ minutes; Studebaker time, 22 minutes.
Route 58, 3.8 miles: Wagon time, 1 hour, 15 minutes; Ford time, 28 minutes; Hupmobile time, 37 minutes; Studebaker time, 43 minutes.
Route 74, 3.2 miles: Wagon time, 1 hour, 15 minutes; Ford time, 19 minutes; Hupmobile time, 25 minutes; Studebaker time, 33 minutes.

BOSTON DISCUSSING TRUCK SHOWS

Boston, Mass., April 28—The question of whether or not Boston will join the ranks of New York and Chicago and discontinue the annual motor truck show will be definitely settled next Wednesday when the matter will be taken up at the annual meeting of the Boston Commercial Motor Vehicle Association.

The feeling among those who were canvassed on the last day of the truck show was to the effect that another show would be held at the same time so the advocates of the November show will be in the minority. But another year may see a show held at a different date from the usual one now. It seems very probable that the vote will be favorable for a truck show in March, and if so Boston will be the only one of the trio of big cities that will have one.

At the meeting last week the following officers were elected: Josiah S. Hathaway, president; J. W. Maguire, vice-president; Day Baker, treasurer; Chester I. Campbell, secretary; Alvan T. Fuller, E. A. Gilmore, John H. MacAlman, A. P. Underhill, J. W. Bowman, C. P. Rockwell, directors.

Good Field in Truck Test

Sixteen Nominations Made for Washington Post's Reliability

WASHINGTON, D. C., April 26—Sixteen trucks have been entered in the truck reliability run of the Washington Post, May 5-8, together with three in the non-contesting division. The contesting trucks are four Atterburys, three Wilcox, Vulcan, Mais, Little Giant, Witt-Wills, Rowe, Hupmobile, McIntyre, Autocar and Lauth-Juergens. The noncontesting division consists of a White, Four-Wheel Drive, and Brown, and these trucks have been entered as ambulances by the Walter Reed General Hospital, a government institution. The one making the best showing will be recommended for purchase.

The route is 288 miles and is through the District of Columbia, Maryland and Pennsylvania. T. B. Shoemaker, of the contest board of the A. A. A., will referee.



CHIEF LONG-TIME-SLEEP, WHO HAS ENTERED THE NATIONAL TOUR

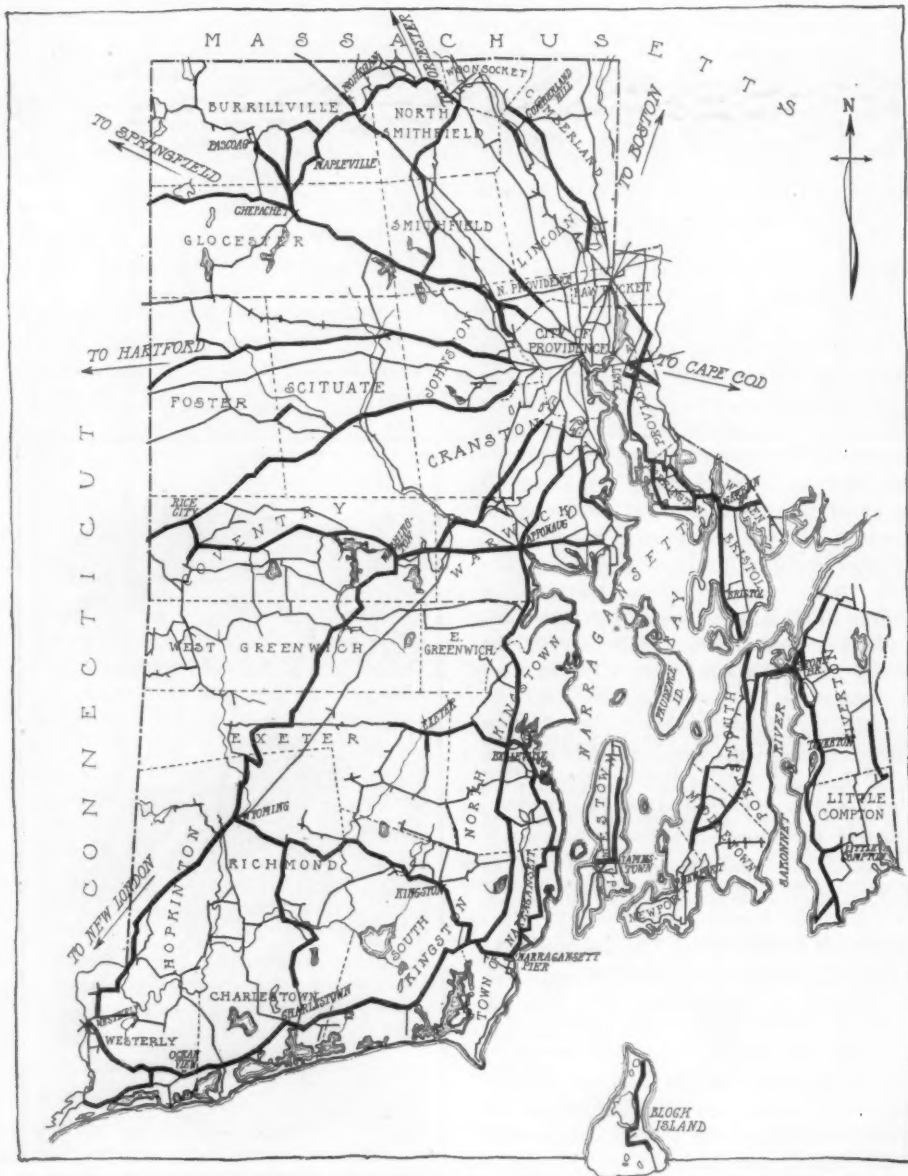
ALTHOUGH the members of his tribe named him Long-Time-Sleep, the redskin motorist who has entered the national reliability run of the American Automobile Association is a progressive Indian. Long-Time-Sleep is one of the wealthiest Indians on the Glacier park reservation and such an ardent motorist that he has a car of his own which he runs over the prairies where once he rode on his untamed pony. The chances are that Long-Time-Sleep is not the only aborigine who will contest against the palefaces on this tour. Joe Knipp, a plutocrat of Browning, Mont., also owns a motor car and is thinking of entering the tour for the Glidden trophy. There are several other wealthy Indians on the reservation who are motorists. They have heard of Long-Time-Sleep's challenge and believe that they can uphold the honor of their tribe as well as he.



SAMPLES OF MEXICAN ROADS OVER WHICH FLETCHER DROVE

SKIRTING deep gullies, jolting over rough roads, and plunging down hills that dropped at an angle of 60 degrees, H. Geoffery Fletcher, Mexico City agent of the American Motors Co., faced death more than once one night during the Mexican revolution when he was impressed into service by the followers of Madero and forced at the point of a carbine to carry six refugees from the capital to a place without the fighting zone. Shortly before midnight on the Sunday that the second revolution broke out, the Yankee motor car dealer was ordered by a squad of soldiers to leave his bed and transport government sympathizers to the outskirts of the city. With a gun leveled at his heart, Fletcher dressed, went to his garage, drove to the hiding places of the refugees and then transported them to a place of safety over roads on which it was unsafe to travel at a snail's pace in the daylight.

Routes and Touring Information



MAP REDRAWN BY J. T. SULLIVAN SHOWING ALL ROADS IN RHODE ISLAND AS THEY WILL BE THIS YEAR

Rhode Island Ready for the Motor Tourists

By J. T. Sullivan

THE state board of public roads of Rhode Island plans to spend this year about \$550,000 on the highways of that state. That does not seem to be a very large sum compared to what other states are spending, but then Rhode Island is not a large commonwealth. However, situated as it is this state finds it imperative to build good roads to connect with those of other states.

Providence is the big center from which all the highways radiate. So to the north there is the road leading to Boston, and Massachusetts having built a fine highway to the Rhode Island line in that direction,

and as this road forms one of the links leading through to the north up to the New Hampshire line; and the latter state having done its share to bring Bretton Woods, the apex of the ideal tour, into good touring condition with her sister states, Rhode Island could not afford to be out in the wilderness of bad highways. So that road was built.

Then there is the road leading to the northwest that strikes for Worcester. Here similar conditions existed and here again the state arose to the emergency.

And when Connecticut got the road-building fever and improved its eastern highways Rhode Island began to extend her roads to join them on her western border and aided to make the chain complete. All that remained then was to build down to the shore where the fashionable world is seen at play in summer and this, too, was done.

The work begun a few years, but carried out more persistently in 1912 than in all the previous years put together, will be continued energetically this year. Of the \$550,000 there will be \$250,000 spent on construction and \$300,000 on maintenance. Rhode Island now can boast of 294 miles of state highway, and this year contracts have been let already for 43 miles more. So this means 336 miles soon, a very respectful showing.

Last year the good roads germ took a firm root in Rhode Island with the result that the legislature passed a bond issue for highways of \$600,000. So work was commenced and about \$350,000 was spent on construction. It is the balance left over that will be expended this year on construction alone. There were 42½ miles built during the year. Of the \$300,000 for maintenance, about \$100,000 will be received from the motorists from registration fees, and the other \$200,000 will come from the regular state appropriation. All told the Board of Public Roads spent about \$700,000 in 1912, the \$350,000 mentioned above for construction and about \$355,000 for maintenance. Of the 294 miles of state highways, 68.35 of this is of bituminous construction. Last year, the board being unable to get satisfactory contracts for resurfacing work undertook to do it under its own supervision, and material and machines were purchased, and the job was carried out with much success.

The board also has rapidly extended the oiling system to its highways in all parts of the state with fine results. This has been found to be very economical in saving the wear and tear of the roads. And the state does get a lot of traffic in the summer.

In addition to the fashionables who drive big, high-powered cars, and who like to tear off fast speed, going to and from New York to Newport and Narragansett another large number visit the state from Massachusetts and Connecticut every Sunday to go to the shore resorts like Rocky Point, where they have baseball games, picnics, clam fests, etc., for the spirit of Roger Williams, the Pilgrims, Puritans or others of the blue laws type does not extend beyond the border of the

Bay state. And the more north one travels from Rhode Island, the stricter the laws governing motoring.

Bridges came in for much attention from the board last year, and this year it will be the same story. All such structures forming a link in the state highways come under the board's jurisdiction now like the ones in Massachusetts are controlled by the highway commission in the Bay state. There are now completed or in process of construction fourteen bridges and six new ones will be built during the coming year.

As a result of the bond issue of \$600,000 last year eighteen different sections of the state have new highways. The town of Warwick got the largest share, a total of 6.21 miles, and a strip on the Centerville road 1.95 miles was also built. Last summer 2.6 miles were built on the Putnam pike running west from Chepachet, and the remaining two miles to connect at the state line at Connecticut with the highway in that state will be built this summer.

The board also resurfaced 2.45 miles of this road running southeast from Chepachet to Greenville, so when the new section is completed it will make one of the best trunk lines in Rhode Island. In the town of Coventry from the Connecticut line toward Rice City on the Plainfield, pike 2.36 miles were built, and the balance of this highway from Rice City leading to Johnston is now under contract to be built. It will be completed this summer and will be about 10 miles in length. When finished it will open up a new truck line across the state to Providence.

East Providence received 2.8 miles, and in the northwestern part of Burrisville .77 of a mile was built near the Massachusetts line. South Kingston, one of the counties fronting on Long Island sound, was one of the large beneficiaries of the bond issue, which called for the construction of 4.66 miles of new road now completed. This was on the Tower hill road running south into Wakefield.

By resurfacing a portion of the Post road in North Kingston it has placed the south county in much better condition. Just below Providence considerable money was spent in Cranston and Warwick, the principal outlet for the motorists of the Capitol city when bound for Narragansett Pier and Watch Hill, in order to make the traveling better, some 4.21 miles being improved. The Putnam pike leading to the northwest from Providence will be completed this year. Last fall 2.67 miles were completed and the balance from Chepachet to West Gloucester will be finished as soon as possible making another good trunk line.

Richmond received 2.80 miles of new highway in one section, and the road connecting that town and Charlestown for a distance of 2.5 miles was newly constructed. This is in the southern part of the state.

Route Inquiries Answered for Motor Age Readers

Tulsa, Ok.-Jamestown, N. Y.

TULSA, OKLA.—Editor Motor Age—I should like to have the best routing from here to Jamestown, N. Y. I am expecting to leave here May 15 or the first of June, and want to know something of the roads at this time of the year. What is the best book for me to get as a road guide, and where can it be purchased?—G. H. S., Tulsa.

From Tulsa to Kansas City the routing is through Collinsville, Nowata, Coffeyville, Cherryvale, Chanute, Iola, Garnett, Ottawa, Olathe, an 83 mile stretch will take you to St. Joseph, Mo., through Leavenworth, Lowmont, Atchison and Russell. The Mt. Ayr road to Des Moines extends through Rochester, Stanberry, Gentry, Grant City, Redding, Mt. Ayr, Tingley, Afton, Macksburg, Winterset, following the red and white signs posted.

By taking the road through Ankeny, Hukley, Ames, Colo, State Center, you reach the Iowa transcontinental road at Marshalltown, continuing on this road to Clinton, Ia., and on into Chicago on an extension following the routing given to the communication from Fairmont, Minn. This will also take you as far as Cleveland, O., from which point you route to Erie, Pa., 101 miles, through Willoughby, Painesville, Geneva, Ashtabula, Conneaut, Girard, and 58 miles to Jamestown, N. Y., over mostly gravel roads,

through Northeast, Westfield, Mayville, Chautauqua and Stow.

These are all well traveled roads with the exception of the stretch at your home end to Kansas City, and at the time of the year you state will be found in no extreme condition.

A Blue Book, Volume 5, will take you from Kansas City to Clinton, Ia.; Volume 4 to Erie, Pa., and Volume 3 to Jamestown, N. Y., and unless you intend staying here some little time and will take motor trips of any length it would hardly be practical to spend \$2.50 for the extra volume to take you this short distance of 58 miles. You can secure the books from the Automobile Blue Book Publishing Co., Karpen Bldg., Chicago.

Pittsburgh, Pa.-Lincoln, Neb.

West Newton, Pa.—Editor Motor Age—Kindly furnish me with the shortest motor car route from Pittsburgh, Pa., to Lincoln, Neb. I am not particular as to going through Chicago if there is a good route south, though I have been over the route.—I. D. Orr.

The best route to Cleveland, 134 miles, takes in Bellevue, Glenfield, Sewickley, Economy, Rochester, Beaver Falls, Darlington, New Middleton, Youngstown, Warren, Parkman, Auburn Center, Chagrin Falls and Randall.



STRETCH OF BITUMINOUS ROAD IN NORTH KINGSTOWN, R. I., BUILT IN 1910 AND NOT REPAIRED SINCE



HEAVY-TRAVELED MACADAM ON NARRAGANSETT ROAD, R. I., BUILT IN 1909

For a through trip, saving a little mileage and some time, on good roads all the way, the Cleveland-South Bend road of 283 miles is recommended by the Blue Book in their routing through Rocky river viaduct, Coonville, N. Ridgeville, Elyria, Oberlin, Wakeman, Townsend, Norwalk, Monroeville, Bellevue, Clyde, Fremont, Hessville, Woodville, Pemberville, Bowling Green, Napoleon, Ridgeville, Archbold, Stryker, Bryan, Edgerton, Waterloo, Kendallville, Wawaka, Ligonier, Goshen, Mishawaka and South Bend. A ride of 100 miles through towns of no great interest, takes you to Chicago. The towns are New Carlisle, Laporte, Westville, Valparaiso, Hobart, Highlands, Hessville, Grasselli, Whiting, South Chicago and Bryn Mawr.

Following the main road to Clinton, Ia., 148 miles, through Garfield Park, Maywood, Lombard, Geneva, Dekalb, Creston, Rochelle, Ashton, Franklin Grove, Dixon, Sterling, Morrison, Fulton and Lyons, the Iowa transcontinental road is followed to Omaha, taking one day to travel through De Witt, Grand Mound, Wheatland, Clarence, Mechanicsville, Mt. Vernon, Cedar Rapids, Belle Plaine, Tama, Mountair, and Marshalltown. To reach Omaha the next night will necessitate traveling 220 miles through State Center, Colo, Ames, Boone, Ogden, Grand Junction, Jefferson, Scranton, Ralston, Carroll, West Side, Denison, Woodbine, Logan, Missouri Valley, Crescent and Council Bluffs.

A good road extends 66 miles through Millard, Gretna, Ashland and Havelock, to Lincoln.

To the Battlefields of the Civil War

Fairmont, Minn.—Editor Motor Age—Through the touring column I would like some advice on the best route from Fairmont via Chicago to Gettysburg, Pa., during the months of June and July. Would one be likely to find a good road from Chicago via Indianapolis, Columbus, O., Wheeling, W. Va., etc.? Is there a good road from Washington, D. C., to Richmond, Va., and does it pass in the vicinity of any of the battlefields of the civil war?—E. W. Bird.

Go east in Minnesota to Albert Lea 87 miles, through Blue Earth and Alden, then south into Iowa as far as Marshalltown, being 41 miles Northwood, Kensett and Manly. It will take you two days to reach Chicago, continuing directly east, the first day being 166 miles to Clinton through Montour, Tama, Belle Blaine, Cedar Rapids, Mt. Vernon, Mechanicsville, Clarence, Lowden, Wheatland, Grand Mound, De Witt and Elvira. The main road to Chicago, 148 miles, leaves Iowa at Lyons, crossing the Mississippi to Fulton and then through Morrison, Sterling, Dixon, Franklin Grove, Ashton, Rochelle, Creston, DeKalb, Geneva, Lom-

Reports on Speed Traps

MOTOR AGE will publish from time to time reports on speed traps throughout the country and will be glad to receive information from motor clubs or motorists discovering any.

WHEELING, W. Va.

The Ohio Valley Automobile Club of Wheeling, W. Va., writes that the nearest thing to a speed trap exists on the National road between Wheeling and Elm Grove. In this district the National road is lined with small suburbs, and they all have their own speed limits. In most places this is set at from 8 to 10 miles, and a close watch is kept by constables.

PHILADELPHIA.

In the neighborhood of Philadelphia the Automobile Club reports that 2 miles south of the commencement of White Horse pike, between West Collingswood and Hadden Heights a plain clothed man on a motorcycle is stationed. A speed trap exists in East and West Whiteland township, Chester county. On Bethlehem pike and Willow Grove avenue, Chestnut Hill, the police have been instructed to watch the speed of motor cars carefully. A 12-mile per hour speed trap is now in operation on Chester pike in Moores at the toll gate where Essington trolley line crosses Chester pike. The balance of the town, also all other towns on the pike limit the speed to 17 miles.

CHICAGO.

In the suburbs of Chicago four traps are in operation. In Evanston a motorcycle officer is active on Clark street near Calvary cemetery. In Oak Park many arrests for speeding are being made, and motorists are especially warned against this suburb. A motorcycle officer is busy in South Chicago, and is especially watchful on Sunday and for the Indiana tourists. Forest Park is a dangerous territory for the motorists. A motorcycle officer is making arrests for speed, and care should be exercised in this neighborhood.

No speed traps are operated as yet in the vicinity of Winston Salem, N. C., Lynchburg, Va., Baltimore, Md., Poughkeepsie, N. Y., Utica, Jamestown, Cortland, Rochester, York, Pa., Cleveland, O., and Milwaukee, Wis.

bard, Maywood and Garfield Park. In traveling between Chicago and Cleveland make a night stop at Kendallville, 161 miles, reached through South Chicago, Highlands, Schererville, Merrillville, Valparaiso, West-

ville, La Porte, New Carlisle, South Bend, Mishawaka, Osceola, Goshen, Ligonier, Wawaka, Kendallville. Continue the next day through Butler, Edgerton, Bryan, Archbold, Napoleon, Liberty Center, Bowling Green, Pemberville, Woodville, Fremont, Wakeman, Oberlin, Elyria and Cleveland, 223 miles.

Go 134 miles to Pittsburgh by way of Youngstown. This is the best road between Cleveland and Pittsburgh, passing through Chagrin Falls, Troy, Southington, Warren, Girard, Youngstown, New Middletown, Enon, Darlington, Pa., Beaver Falls, Freedom, Ambbridge, Glenfield and Pittsburgh.

A beautiful day will be spent in reaching Gettysburg, traveling 180 miles through scenic mountain country. Considerable caution must be in perfect order to respond instantly. You will pass through Wilkinsburg, E. McKeesport, Grapeville, Greensburg, Youngstown, Ligonier, Jenners, Stoyestown, Kantner, Schellburg, Bedford, Everett, McConnellsburg, Fort London, Chambersburg, Fayetteville and McKnightstown.

The famous civil war battlefield at Gettysburg has been laid out into fine avenues, and motorists may speed along with magnificent monuments which have been erected by the various states, on the right and left. Mostly toll roads exist on the way to Washington and the first one is encountered just outside of Emmitsburg, one at Thurston, Harmony Grove and Frederick. Whittier's Barbara Fretchie refers to this locality, and the author of the Star Spangled Banner, Francis Scott Key, is buried in Mt. Olivet cemetery. Through more historic country by way of Hyattstown, Rockville and Dupont Circle, you arrive at Washington. Arlington, 4 miles out, is a tourist viewpoint. Here is located Arlington House, an example of the early Virginia home of the highest type, first the home of a step-grandson of George Washington, then it became the home of General Robert E. Lee, who lived there until the days of the war. The estate was next confiscated and employed as headquarters for the Federal troops, and finally turned into a national cemetery, where more than 15,000 soldiers are buried. Cabin John's bridge is a 10 or 12-mile ride over a fine road built on the top of a great aqueduct which carries the city's supply of water from the upper Potomac river district. Beyond the bridge a short distance are the Great Falls of the Potomac. Mount Vernon is only 12 miles from the city and should never be neglected by a motorist finding himself in Washington. The many government buildings naturally want to be seen.

Going through Annandale to Fairfax you find another familiar civil war town. In the courthouse will be found a monument erected to the first soldier killed in action in the war, and in the clerk's office is the original will of George Washington in his own handwriting. The ground upon which two famous Bull Run battles were fought is Manassas, and the earthworks remain to mark this spot. Through Middleburg to Warrenton, Opal and Remington, where several fights occurred. Inlet to Culpeper, where the battle of Cedar Mountain was fought and a national cemetery now contains upwards of 1200 Federal dead, to Madison Mills, Orange, the birthplace of Zachary Taylor, our twelfth president, to Gordonsville, where more blood was shed, to Louisa, Cuckoo, and Glen Allen to the Confederate capital.

Here the Confederate museum, in war days known as the White House of the Confederacy, is noteworthy. A room is dedicated to each of the Confederate states, and the Mississippi room was the location of Jefferson Davis' study, where the Confederate cabinet sat, and relics are appropriately placed here.

Colonial and national memories are very plentiful in Richmond. In St. John's church, Patrick Henry made his speech before the convention urging resistance to England; in the capitol square, likewise other parts of the city, are imposing monuments, the one of Lee unquestionably being the finest equestrian statue in the country. Hollywood and Oakwood are national cemeteries where soldiers who fell in the siege of Richmond repose; and Washington's old headquarters, Gamble's Hill, overlooking Belle Isle, the site of Libby prison and Libby Hill Park, overlooking the James, are points of interest to the visitor.

Varma, on the James River 14 miles from Richmond, is believed to have been the home of Powhatan, the Indian sagamore or emperor, his daughter Pocahontas and John Rolfe.

Blue Books 4 and 3 will be useful to you for running directions.

Three Short Trips From Chicago

Harvey, Ill.—Editor Motor Age—I would like to know the best road for motor cars from Chicago to Green Bay, Wis., also Chicago to Hillsdale, Mich., and Chicago to Streator, Ill.—Dr. Blair.

Recent Road Conditions in Ohio and Indiana

THE Automobile Blue Book has gathered the following additional reports on road conditions in Indiana and Ohio flood districts to those published in Motor Age last week:

South Bend to Indianapolis via the Michigan road is open all the way, although it is necessary at Logansport to use the Eighteenth street bridge and after crossing the Wabash river come back west 1 mile to Michigan road.

The road from Laporte to Logansport via Star City also is open. The best way from Logansport to Indianapolis, however, is via Walton to Kokomo and then south through Westfield.

Logansport to Lafayette via Deer Creek is all right, although it is necessary as above to use the Eighteenth street bridge across the river.

At Peru both the Broadway bridge and the bridge a mile and a half west are out. Travel between Peru and Kokomo must be over what is known as the Straw Town road. To cross the river at Peru it is necessary to use the concrete bridge on the east end of the city. In travel from Peru to Huntington and Ft. Wayne the higher roads on the north side of river are advised for the present.

Kramer, Ind., reports all roads in that section in surprisingly good condition. No detour is necessary and parties from there have made the trip clear through to Chicago and also to Indianapolis.

The road from Terre Haute via Sullivan to Vincennes is open, but it is not possible to get more than 7 miles south of Vincennes as the White river is still overflowed in the lowlands.

Bedford, Ind., reports that although roads are considerably washed all are passable and no important bridges are out.

From Terre Haute to Danville via Clinton use the Hill road east of St. Marys and turn east at pontoon bridge through Shepherdsville, thence on the river road to Clinton. At Clinton tourists should take a side of the river they wish to follow and stay on that side.

Richmond, Ind., reports all roads in that county are open and no bridges of importance out. Similar good reports from Anderson, Ind.

Veedersburg, on the route between Craw-

fordsville and Covington, reports that considerable damage has been done in that section. Although it is possible to get through, a number of short detours are necessary.

Shelbyville, southeast of Indianapolis, reports a number of bridges out on main lines. It is probably not advisable to go into that section of Indiana for 2 or 3 weeks.

Lawrenceburg, which is on the main line from Greensburg to Cincinnati and also on the river road to Louisville, states that bridges are practically all out in that vicinity and roads very badly washed. Last week it was impossible to go to Cincinnati by either road or rail.

The Columbus Automobile Club, Columbus, O., states that conditions of roads in that locality are fair as a rule and that although a number of bridges are out they are for the most part on minor routes and in all cases of importance temporary crossings have been effected.

Springfield, O., reports the National pike to Columbus rather rough, but in use now.

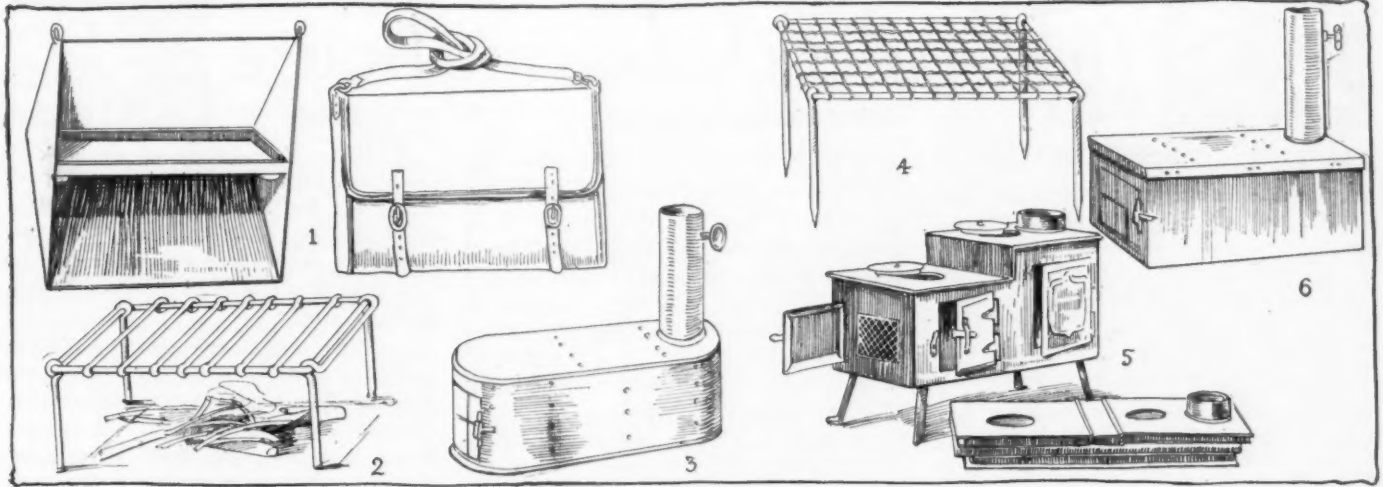
Springfield to Urbana the straight road is in bad condition for the present. They are using what is known as the pike road, which is good. Go east on Main street to Lagonda avenue, thence north for about 5 miles and keep left at a fork, meeting the regular route into Urbana.

Springfield to Dayton both upper and lower roads are very bad on account of bridges out, also highway washed in many places. For the present all travel should go via Xenia, although longer roads are in excellent shape.

Lima, O., reports that roads in that section are in good condition and people are driving every day to Dayton.

The Automobile Club of Cincinnati reports that the only road in its immediate section that is closed is the road to Lawrenceburg. It states, however, that the county already has taken steps to put in a temporary structure and this road should be open in a short time for traffic purposes.

At Hamilton all bridges were swept away, but a temporary pontoon bridge is now open. Although it is possible to get through to Dayton via Lebanon travel for Springfield and beyond is recommended to go via Lebanon and Xenia for the present.



Although not the most direct route, a pleasant one-day journey will be to Lake Geneva and Milwaukee, 136 miles. Passing through Garfield Park, Oak Park, Maywood, Addison, Ontarioville, to Elgin, home of the Elgin watches, the center of the western dairy industry and home office of Borden's condensed milk. Quiet scenery along the Fox River is to be found going from Algonquin to Crystal Lake, McHenry, Ringwood, Hebron, Lake Geneva. Motor through Spring Prairie, East Troy, Mukawonago, Waukesha and Brookfield to Milwaukee. Here a drive along the north lake shore to Whitefish Bay should not be overlooked. The immense concrete viaduct at Grand avenue, and further west the national soldiers' home, are things to be seen.

Headed for Green Bay, leave Milwaukee over the lake shore drive, going past Whitefish Bay, Port Washington, Sheboygan Falls, and the Green Bay road to Manitowoc, Cooperstown, Pine Grove and Bellevue. On the way into Cooperstown caves and other peculiar rock formations in the valleys will be noticeable. Only 125 miles is the distance for the second day.

The trip to Hillsdale will not be as interesting as the above. It passes through towns of little importance with a few exceptions. The 203 miles extend through South Chicago, Whiting, Grassell, Hessville, Highlands, Hobart, Wheeler, Valparaiso, Westville, Laporte, New Carlisle, South Bend, Mishawaka, Goshen, Elkhart, Middlebury, Howe, Coldwater and Jonesville.

You will find it a trip of 100 miles to Streator, and good gravel roads throughout. A pleasant trip will be experienced through Garfield and Forest Park, Hinsdale, Naperville, Aurora, Montgomery, Yorkville, Newark, Danway, Ottawa and Grand Ridge. While in this neighborhood you should visit Starved Rock and Deer Park, located near Utica on the road from Ottawa to LaSalle.

A volume 4 Blue Book is used for all running directions.

Oshkosh, Wis.-Grand Rapids, Mich.

Oshkosh, Wis.—Editor Motor Age.—Kindly give information as to the best route to Grand Rapids, Mich., avoiding Chicago. What are the accommodations for cars from either Milwaukee or Manitowoc across the lake? Can they unload a new car without scratching it?—Fred J. Smith.

You will have to motor to Milwaukee to get direct shipment to Grand Haven. The distance is only 81 miles, and if you leave in the morning you will have time to motor a little in Milwaukee as the boat does not leave until 9 o'clock in the evening.

Your itinerary lies through Van Dyne, Fond du Lac, Byron, Lomira, Theresa, Addison, St. Lawrence, Schleisingsville, Richfield, Meeker, and Menominee Falls. The roads are all gravel and lead through rolling country.

You should have your car at the docks of the Crosby Transportation Co. at least a half hour before sailing. The touring car rate one way is \$10 and round trip \$15. The boat gets into Grand Haven at 5 o'clock the next morning.

It is a run of 31 miles over good natural roads from Grand Haven to Grand Rapids, passing through Allendale.

As for unloading without scratching the car, Motor Age cannot vouch for what other companies may do in conducting the business. It is reasonable to expect, however, that care will be taken in handling unprotected freight.

A Blue Book 4 would be useful, not only in giving running directions to your destination, but in any short trips you may want to take while in Michigan.

Motor Camping Hints

THE illustrations show cooking outfits from which the camping motorists can make their selection. A baker, shown open and closed in Fig. 1, is really not a necessity in a camping expedition, unless a hunting excursion is the object of the tour. The baker has strong legs to keep it upright and a handle for moving it about. One size is 24 by 15 by 8 inches and weighs 4 pounds, being sold for \$4. The waterproof case shown is not included in this price.

The grate in Fig. 2 is for a camp fire and made of heavy wire rods with legs 14 inches long, which fold back under the rods for packing. One size is 12 by 24 inches, weighs 4 pounds and costs 85 cents.

Fig. 3 is an example of the lightest weight portable box stove made. It is of sheet steel, well riveted and reinforced where necessary. There are no lids, which makes the stove more durable and not so apt to warp as with openings on top. Five lengths of telescoping pipe and damper in pipe are provided. The 10 by 12 by 25-inch size weighs 14 3/4 pounds and costs \$4.25. They are regularly made without a bottom, but one with legs attached is to be had for \$2. In our opinion this latter is a useless expense. Cooking utensils and sundry articles can be advantageously packed in a box stove.

Another form of camp grate is illustrated in Fig. 4. It weighs 26 ounces and is 9 by 14 inches.

The stove in Fig. 5 is made of sheet steel and will burn anything but coal. It is 23 inches long, 12 inches high and 12 inches wide, the oven is 8 by 8 by 12 inches deep and sells for \$8. The weight is 25 pounds. A larger stove with four cooking holes weighing 42 pounds can be had for \$10.

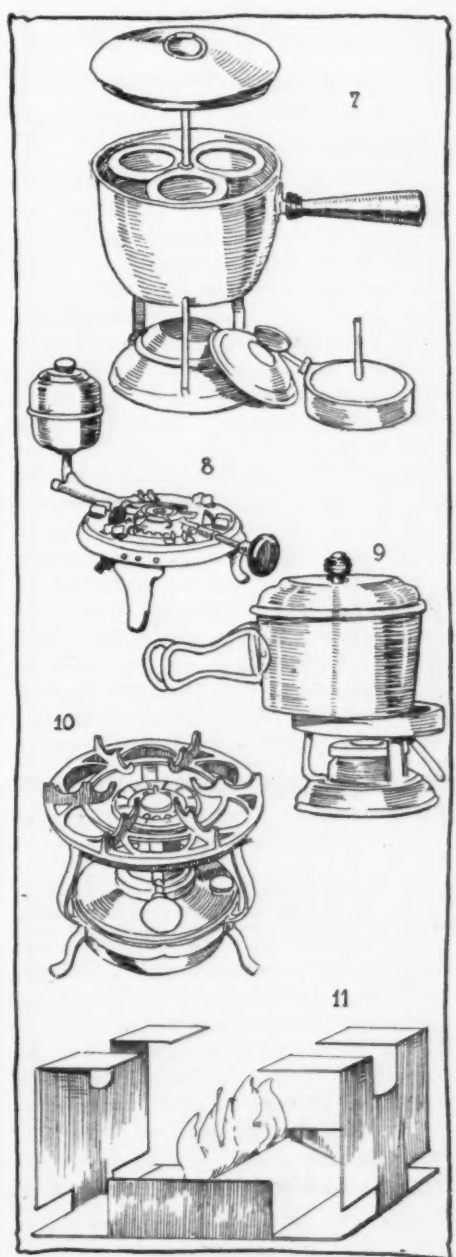
Fig. 6 is like Fig. 3 except that it is a folding stove and collapses into a package an inch thick. The same size as Fig. 3 costs \$5.20 and weighs 17 1/4 pounds.

An alcohol cooker which costs \$3 is shown in Fig. 7. It is made of nickel-plated brass, and the stand, lamp, egg rack, tea and coffee ball and handle fit inside the cup. The stand has collapsible legs which nest compactly.

Fig. 8 is a portable alcohol gas stove, and manufactures its own gas as required. Any alcohol can be used in these stoves, but denatured is the best. The weight is 2 1/2 pounds, and sells for \$3.50.

The lamp and standards in Fig. 9 likewise pack into the pan. This is made of aluminum with asbestos burner, and has a folding handle. The price is \$1.60.

No. 10 is made of nickel-plated brass, with japanned iron standards. It burns denatured alcohol gas mixed with air, and



is regulated the same as an ordinary gas range burner. The price is \$2.50.

No. 11 is a folding alcohol stove, made of nickel-plated brass. The asbestos is soaked with alcohol and the cooking utensils are placed on top.



The Readers' Clearing House



FLOODING CARBURETER LEAKS

High Float or Improperly Seating Fuel Valve, the Cause

FRANKLIN, ILL.—Editor Motor Age—Kindly advise me, if possible, what to do with a Breeze automatic carburetor which will leak in spite of all that I can do. It is on a Hupmobile car and has never given any trouble whatever until recently, when it began to leak. I fitted it with a new float with no better results than before. It then was cleaned thoroughly and the float lowered, and still it leaked, whereupon I lowered the float the second time and it is leaking now. The parts are all in good repair, the union connecting it with the supply pipe is tight, but even when the adjusting screw on the dial is screwed down tight it will drip, signifying a leak at some place, but find it I can't.

I might add that the motor works perfectly and that the carburetor seems to handle the heavy gasoline of today as well as the kind I bought 3 years ago.

2—Is there any way of tightening the clutch on a 1910 Hupmobile to prevent slipping? It is a multiple disk type. Is there any special grease manufactured for a clutch of that type?—Burley F. Wright.

The leaking of your Breeze carburetor in all probability is due to one of two things—first, flooding caused by the float being set too high, or flooding caused by the fuel valve not seating properly. The fact that this valve does not seat properly may be due to the fact that it has become worn or that a little sediment or dirt has become lodged under it. Clean up this valve and make sure that it seats properly, and if this does not remedy the difficulty, lower the float until the leaking stops. If the trouble still is present, the best thing you can do is to send the carburetor to the factory for overhauling.

2—There is no way of tightening the clutch on a 1910 Hupmobile. If you will clean out the clutch thoroughly, flush it out with kerosene and run the motor for a minute or so with kerosene alone in the clutch and gearset, and then put the oil in, the slipping may be overcome.

WANTS TO CHARGE FORD MAGNETS

Reader Advised That Factory Only Can Do the Work Well

Menominee Falls, Wis.—Editor Motor Age—I would like information as to the correct method of recharging a Ford magneto, using six 6-80 storage batteries.—J. B. Wittlin.

The Ford company does not advise that owners recharge the magnets, as invariably poor results are obtained. The maker suggests that owners send either the magnets to the factory or a service station. No charge is made for this work if the car is a 1912 or 1913 model, and a very small charge is made for charging magnets of cars of earlier make.

WANTS TO BECOME MEMBER S. A. E.

Temperature in Cylinder Given—Book on Car Construction

Columbia, Mo.—Editor Motor Age—What are the requirements for admission to the S. A. E.?

2—Would like the name of a book or periodical dealing with materials of motor car construction, such as alloy steels, etc.

3—What is the temperature and pressure in a motor car cylinder just after ignition?—Subscriber.

Questions Answered and Communications.

Burley F. Wright....Franklin, Ill.
J. B. Wittlin...Menominee Falls, Wis.
Subscriber.....Columbia, Mo.
A. L. Sheridan...Indianapolis, Ind.
A. Hudson.....Iola, Kan.
A. D. Carpenter...Sauk Center, Ia.
C. L. Bennett....Georgetown, Ill.
A. Reader.....Johnstown, Pa.
Harry Prescott....Sioux City, Io.
George O. Hodge....Wenona, Ill.
H. Henley.....Convent, N. Y.
Fred Schevamt....Milwaukee, Wis.
J. O. I.....Philadelphia
G. S. Durham.....Leland, Ill.
H. T. McLane.....Spencer, Ia.
Reader.....St. Louis, Mo.
F. W. W.....La Porte, Ind.
N. C. Shafer Co....Rensselaer, Ind.

1—The following extracts are taken from the by-laws of the S. A. E.

Persons connected with the arts and sciences relating to the engineering or the mechanical construction of automobile vehicles may be eligible for admission into the society.

The membership of the society shall consist of honorary members, members, associates, juniors and international members. Honorary members, members and associates are entitled to vote and to hold office. Juniors and international members shall not be entitled to vote nor to be officers of the society, but shall be entitled to the other privileges of membership.

A member shall be 26 years of age or over. He must have been so connected with engineering as to be competent, as a designer or as a constructor, to take responsible charge of work in his branch of engineering, or he must have served as a teacher of engineering for more than five years.

An associate shall be 26 years of age or over. He must either have the other qualifications of a member or be so connected with engineering as to be competent to take charge of engineering work, or to co-operate with engineers.

A junior shall be 21 years of age or over. He must have had such engineering experience as will enable him to fill a responsible subordinate position in engineering work, or he must be a graduate of an engineering school.

An international member shall be a member in good standing of any foreign engineering society of similar aims recognized by the council of this society and extending similar rights to the membership.

2—Motor Age knows of no book devoted entirely to the materials of the motor car, but James Gunn in his "Practical Designs of Motor Cars," deals at length on the materials of the motor car. The book is published by Longmans, Green & Co., New York.

3—The temperature varies with different makes of motors. Usually, however, 500 degrees Fahrenheit is the temperature. Immediately after ignition the pressure would be slightly less than the maximum pressure. This varies with motor types,

DISCUSSES GEAR RATIO QUESTION

Hoosier Supplements Answers to Inquiries on Engine Dimensions

Indianapolis, Ind.—Editor Motor Age—I wish the privilege of adding to one answer and pointing out an error in another in Motor Age issue March 27.

First, in answering Rollin E. Smith's query on page 34, as to why, if his motor is most efficient at 800 revolutions per minute and his usual driving speed is 20 miles per hour, should his motor not be geared so that 800 revolutions per minute comes at 20 miles per hour. If his motor is most efficient at 800 revolutions per minute, that is, doubtless with the throttle wide open, as efficiency drops very rapidly for closed throttle conditions—on account of low compression.

Now, an ordinary sized car requires not over 6 horsepower to maintain—not obtain. In the case I am considering acceleration would have to be obtained on a lower gear—a speed of 20 miles per hour on level pavement with no headwind. It would take a very small motor, indeed, under 70 cubic inches, that would have a maximum of 6 horsepower at 800 revolutions per minute.

True, this would give him some 60 or over miles per gallon of gasoline, but he would never go any faster than 20 miles per hour unless his motor developed more than 6 horsepower at some higher revolutions per minute, and the only way he could utilize this would be to drop to a still lower gear—more than 800 revolutions per minute at 20 miles per hour—so as to get tractive effort for further acceleration. Incidentally this points out why the 3 liter and under—183 cubic inches and under—French and English cars, even though they weigh 3,500 pounds with limousine or other heavy body, obtain such, to us, phenomenal mileage per gallon of petrol. The only proper way to gear a given car with a given motor is so that the motor turns at that speed at which it develops its maximum horsepower when the car, with the top up and fully loaded, is moving just as fast as it can be driven by the

same horsepower as a maximum motor develops.

In the answer of Motor Age to the first question of Subscriber from Mexico, Mo., page 35, who asks why a long stroke motor gets more expansion from a given amount of gas than a short stroke does, the correct answer is, "It doesn't." As to the gun you are correct. Assuming the same bore of gun, then for the same wind resistance—assuming speed will be the same—to be met by projectile, the long gun gets more expansion out of its gas and hence carries farther than the short.

In a motor car cylinder the conditions are different. Taking engines of the same displacement, for the same compression pressure you will have the same ratio of clearance volume to displacement volume, hence your combustion chambers—motor on top center—of long and short stroke cylinders will be of the same capacity. Hence, final capacity being the same—pistons on bottom center—you are getting identically the same expansion.

The true reason why the long-stroke motor is more efficient is this: Remembering that the motor with the least cooling area is the most efficient thermally, we find that at that time on the firing stroke at which the burning gas in the cylinder is at its highest temperature, the cooling area exposed to the same volume of gas is minimum in a motor with a stroke to bore ratio of somewhere between 1.3 to 1 and 2.0 to 1.—A. L. Sheridan.

ALUMINUM AND IRON CRANKCASES

Some Reasons For and Against Each— Cadillac Uses Cast Iron

Iola, Kan.—Editor Motor Age—I would like the names of a few motor car manufacturers who use cast-iron for crankcases.

2—What is the advantage of cast-iron for crankcases?

3—What is the advantage of aluminum for crankcases?—A. Hudson.

Hupmobile and Cadillac cars have cast-iron crankcases.

2—The fact that cast iron is cheap is the real reason for its adoption as crankcase metal. The cost of replacing a broken crankcase is not very great. It is more easily repaired than other crankcase metals, for here the welding process may be used to advantage. Aluminum welding is much more expensive.

3—Aluminum does not rust to any extent as does iron or steel. It is light in weight and can be made to withstand great strains. Aluminum crankcases are not merely aluminum, but aluminum alloyed with other metals. The combination makes a light, strong, but costly metal. It is not cracked as easily as is cast-iron.

DISCUSSION ON TIRE RETREADING

Reader States That Inner Liners Eliminate Punctures and Blowouts

Sauk Center—Editor Motor Age—Under the caption, "Does Retreading Pay?" we asserted some months ago that retreading did not pay, no matter in what condition the tires were at the time of repair. Some

of the rubber tire makers under the impression that at certain times it did pay to have the tire retreaded wrote a somewhat lengthy article in which one was made to believe that my article was not as it should be, and that retreading properly done at a certain time really did pay to retread.

Assuming that I was in error I tried another casing which was in the condition mentioned by the articles in question, and desiring to try out their plan, I sent this casing to a large house in the tire business with a request that they do the very best possible on this tire and return it to me. In due time the tire came back, and really looked fine, so I put it on the wheel and by speedometer test run it about 1,000 miles and it was all in, I must tell you; as ragged as an old she bear in June! Not only this but it was not safe to use on any roads whatever, and this again in the face of the fact that I am a most careful driver at any and all times, and watch the road steadily.

I also have questioned a lot of drivers in regard to the matter and each and

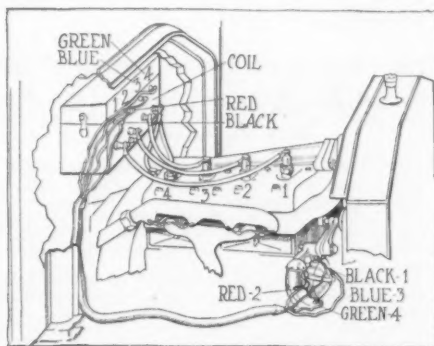


FIG. 2—WIRING OF FORD MOTOR

every one said plainly their experience was against having any tire retreaded, no matter what condition it was in. It will be plainly seen that it would cost one \$24 per 1,000 miles of service, basing it upon the cost of the one tire retreaded and mileage given, to use four retreaded tires, which is over three times the cost of a new tire on the same road and distance traveled.

There is another idea I wish to mention and that is a word regarding inner liners, mention of which I made in a late issue of Motor Age, and in this article I pointed to the great increase of the inner liner concerns as an argument in favor of heavier tires. I have been giving a set of four inner liners a good test in my tires and find that the five-ply kind, with certain specifications, fill the bill most satisfactorily. I gave them over 5,000 miles work and must say they are as good, natural wear and tear excepted, as when they were placed in the casings. Further I never had one puncture nor a blow-out in any of these four tires during this distance traveled, and I must say I never had as peaceful and pleasant motoring in my whole extended experience.

These inner liners are made nearly identical with the standard tire of today. This further experience proves that the tire would be much better to the user if it had a heavier tread from the 28-inch up, and would give vastly better mileage. My inner tubes are not rotten nor burned up by heat, and I traveled in nearly all kinds of weather, snow, ice, cold. I feel certain that these same inner liners will take me another 5,000 miles, and this test was made with tires which had run nearly 5,000 miles before I put them in. From the inquiries received up to this time regarding the names of those makers who put more plies of fabric in their tires must assume that a few motorists are interested in heavier tires, and read my article with profit.—A. D. Carpenter.

WATER-JACKETS OF MOTOR RUSTED

Scraping Only Way of Getting Rust From Water-Jackets

Georgetown, Ill.—Editor Motor Age—How can one get rust out of the water-jacket of a water-cooled engine?

2—Where can I obtain Bowden wire controls for gas and ignition control?—C. L. Bennett.

1—Motor Age knows of no substance which will remove rust from the water-jackets of an engine, without injuring the metal of the jackets. However, if crude oil is poured first into the water-jackets and permitted to remain there a while, it may have a tendency to loosen the rust, which might flow out with the water later. A method employed often in removing rust from water jackets is to scrape out the rust. This is done by removing first the water-jacket plugs. These plugs cover holes through which the jackets were scraped after the cylinder was cast. However, tools specially designed to fit into the jacket must be obtained. It is best to let the factory scrape out the rust, for it alone has the facilities.

2—Bowden wire controls may be obtained from J. S. Bretz Co., New York.

PUMP DOES NOT CIRCULATE WATER

Reader Thinks Fan Not Efficient for Cooling Motor

Sioux City, Ia.—Editor Motor Age—I have a Bergdoll-40, 4 by 6-inch motor, the fan is about 6 inches from the radiator, and does not seem to throw enough wind to keep the motor cool. The car is new. I have driven it about 500 miles and it seems to get too hot for this time of the year. If it gets so hot now, I am afraid the engine will overheat in July and August. Would moving the fan closer to the radiator help any, or, if I leave it where it is and put on a smaller pulley, making the fan run faster? But the fan does not draw the air through it strong enough. It should draw air strong enough to hold a paper on the front side but does not do so. The fan has 5 blades and they are bent right. Does Motor Age think that a larger fan set close to the radiator would keep the motor cool?—Harry Prescott.

There is no reason to believe that the fan is not large enough for the Bergdoll motor, for it is of ample size to cool such an engine. It may be that the engine overheats because the fan belt is slipping. Adjust the fan belt and watch it while the motor is running and notice if it slips. Adjust it tightly enough so that it will not slip and perhaps the overheating will

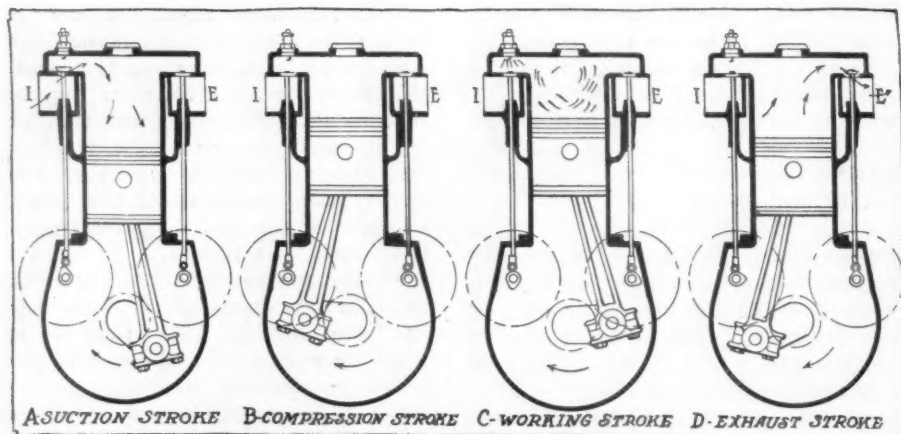


FIG. 3—OPERATION OF FOUR-CYCLE MOTOR

vanish. However, if the fan belt is tight already, the water system should be looked after. First see that there is sufficient water in the radiator. Then remove the filler cap of the radiator and while the motor is running notice if the water is circulating.

An effect similar to that of ebullition is seen if the water is being circulated. Your motor may be overheating because the water pump is not pushing the water around. The pump on the Bergdoll is of the paddle type and the paddle is keyed to a shaft. In very cold weather, the paddle may shear the key with the result that the paddle will not turn and the water not circulate.

Too little oil being fed to the cylinders will cause the motor to heat rapidly and the same result will be had from too much oil. A tight piston also will cause overheating. Running the motor for a long time on a retarded spark will cause overheating. It remains to look after the things above mentioned before the blame has been laid on the fan.

COST OF PAINTING A TOURING CAR As Variable as the Price of Clothes—What Constitutes a Good Job

Johnstown, Pa.—Editor Motor Age—I have a light five-passenger touring car of 112-inch wheelbase, and would like to know what it should cost to have it painted the same color that was on, not removing any of the old paint except in the wheels; also what constitutes a good job of painting.—A Reader.

The cost of repainting varies greatly. In Chicago one is able to have a car painted for anywhere from \$25 to \$80, the cost depending entirely upon the kind of a job wanted. There will appear in Motor Age in a few weeks an article on the painting of a car, in which will be told the methods of painting and the requirements of a good job.

HEAT A DESTROYER OF MAGNETISM Magnets of Magneto Get Hot, Making Them Inefficient

Convent, N. J.—I have a car on which the magneto is placed $\frac{1}{2}$ -inch from the exhaust pipe, and I find that after a long hard pull the magneto gets so hot that I cannot touch it. Does Motor Age think that the extreme heat would impair the efficiency of the magneto, apart from burning the insulation on the wiring? The magneto is a Bosch D U 4.—H. Henley.

Yes. Heat is a destroyer of magnetism.

If a magnet were placed in a flame for any length of time the magnetism formerly in it would no longer be present. Often after a motor car has been afire, and the flames enveloped the motor, it has been found that the magnetism of the magneto magnets had vanished completely. It follows then that any heat coming in contact with the magneto magnets will cause them to lose some of their magnetic properties.

TROUBLE WITH OVERLAND GEARSET Reader Interested in Ford Wiring—Pressure in a Cylinder

Milwaukee, Wis.—Editor Motor Age—As I have read in several issues of Motor Age regarding the figuring of horsepower, I am anxious to know at what certain revolutions per minute of the crankshaft manufacturers of motor cars figure the horsepower of their motors.

2—Has Motor Age a method of ascertaining the pressure in pounds per square inch in cylinders?

3—Can Motor Age give some drawing of the ignition system used by the manufacturers of the Ford car for 1913?

4—We have a model 46, four-passenger Overland with planetary type of transmission and we have considerable trouble with the discs and drums wearing. Could a selective type of transmission readily be put in its place without a great deal of expense?—Fred Schevamt.

1—The S. A. E. horsepower formula is based upon 1,000 feet per minute piston speed. At the factories the motor is tested upon a block and the horsepower readings taken at different speeds of revolution. Each manufacturer has his particular way of measuring horsepower.

2—This is given in the issue of April 17, page 32.

3—The wiring of the Ford motor is

shown in Fig. 2. The wires are covered with cotton, each wire being colored different from the others. This method insures the proper replacement of the wires. The black wire is for cylinder 1, the red for cylinder 2, the blue for 3 and the green for 4. The source of current is a magneto, which is incorporated in the flywheel. The current from the magneto, which is of the low-tension type, is led to a commutator. Here it is sent at the proper time to a vibrator coil on the dash of the car. The voltage of the low-tension current is here raised and the high-tension current resulting is passed to the spark plug.

4—It is possible to change the type of gearset, but the cost would be too great.

FORD BODY HANGS FROM 2 POINTS Reader in Dispute—Ford Has 3-Point Suspension Motor

Wenona, Ill.—Editor Motor Age—In order to settle a dispute kindly advise me whether or not the Ford is a three-point suspension car.—George O. Hodge.

The power plant of the Ford is suspended from three points. The body is suspended from two points.

AIR-COOLED FRANKLIN OVERHEATS Many Reasons Given—Timing Valves of Model G Franklin

Philadelphia—Editor Motor Age—What is the correct valve timing on a model C 1907 Franklin? This model has two sets of exhaust valves, one at the top and one at the bottom of the cylinder.

2—I have a car of this model which, notwithstanding that it gets plenty of oil, seems to run hot, that is, kicks over after the switch is cut out. I do not think this is due to carbon. Can Motor Age advance any probable cause for this; could it be due to late valve timing?—J. O. I.

In Fig. 5 is shown a Franklin timing chart. Timing instructions follow: On the flywheel of the motor are two marks reading 1—4, 2—3. There is a mark on the cylinder flange which represents the mid point of the motor. When the mark 1—4 is in line with the mark on the cylinder, it means that the pistons of cylinders 1 and 4 are at the uppermost positions. When the mark 2—3 is opposite the mark on the cylinder it means that pistons in cylinders 2 and 3 are up as far as they will travel. When the mark 2—3 is on or a little past the mark on cylinder No. 4 the exhaust valve of cylinder 1 should start to open. If it does not start to open there are screws on the valve rod

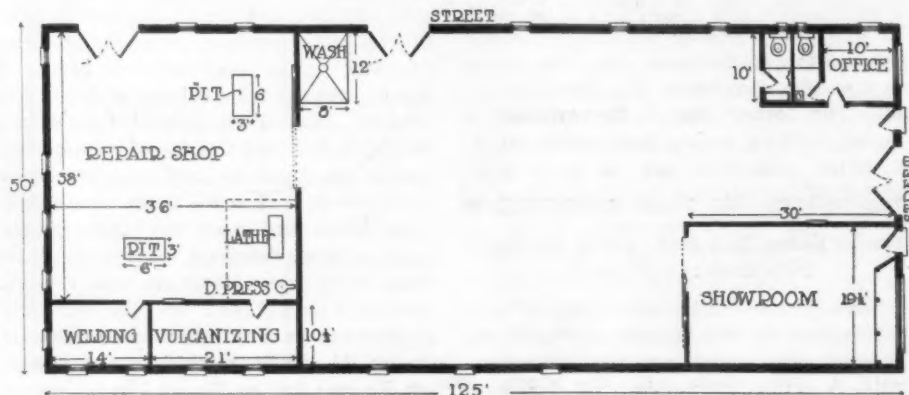


FIG. 4—PLAN OF MAXWELL GARAGE

which should be adjusted so that the valve does open.

Then push the flywheel around in the direction of the arrow until the mark 1—4 is $2\frac{1}{4}$ inches past the mark on cylinder No. 4. At this point the valve which opened before should now be closed. If not the adjusting screw should be lowered until it does close. Now bring the mark 1—4 on the flywheel opposite the mark on the cylinder. Then push the flywheel $\frac{1}{8}$ inch past this mark. At this point No. 1 inlet valve should begin to open. Push the flywheel around until the mark 2—3 on the flywheel is $5\frac{1}{4}$ inches past the mark on the cylinder and at this point No. 1 inlet should just close. On the next revolution of the flywheel No. 2 valves should be timed, then 4 and then valves of cylinder 3, all to be timed in the same way as the valves of cylinder No. 1.

The valves of cylinder 2 are timed from the line 2-3. Those of cylinder 3 are timed from the same line and valves of cylinder 4 from the line 1-4. The valves should be timed in the order 1, 2, 4, 3, for that is the firing order of the motor.

2—Granting that carbon is not causing the overheating, the following may be given as probable causes: Too much oil being fed to the cylinders will cause them to overheat and when the cylinders are very hot the incoming gas is ignited by the heat of the metal cylinder. A tight piston will cause excessive friction between piston and cylinder, thus increasing the amount of heat in the cylinder. The overheating causes the motor to run with the switch off. If the engine is run continually on a retarded spark, the motor will overheat, and if allowed to run too long will cause the cylinders to overheat sufficiently to keep the motor running with the switch off. The motor should not be raced, as a continuance of the practice may cause overheating. Too rich a mixture often causes overheating. Try a heavier grade of oil and perhaps the heating will be lessened.

CARS USING SMALL SIZED MOTOR

Two Makes of Motor Cars with Small Bore and Using Small Tires

Leland, Ill.—Editor Motor Age—Is any motor car being made with four cylinders, 3-inch bore, and about 4-inch stroke, with a 30 by 3-inch tire?—G. S. Durham.

The nearest approach to the cars you wish are the Hupmobile 20, Ford and Metz. The former has a four-cylinder motor with a bore of 3.25 and a stroke of 3.38 inches. The tires are 30 by 3 in front and 30 by 3 in the rear. The Metz and Ford have the same sized motor, 3.75 by 4.00. The former has 30 by 3 inch tires all around and the latter 30 by 3 in front and 30 by $3\frac{1}{2}$ in the rear. Complete specifications of the cars on the American market were given in Motor Age, issue of January 9, from which table the above figures were obtained.

METHODS OF VALVE TIMING VARY

Not All Motors Have Valves Operating in the Same Manner

La Porte, Ind.—Editor Motor Age—Would Motor Age give a diagram of a four-cylinder motor showing the position of the inlet valve and the exhaust valve when it sparks?

2—Show how the intake and exhaust cams should be when timed.—F. W. W.

In Fig. 3 is shown a diagram of the operation of a four cycle engine showing the positions of the valves and cams. The point at which the valves open varies with the different makes of engines. That is, not all engines are timed exactly alike. Referring to Fig A, it will be noticed that on the suction stroke the piston is moving downward. At the same time the intake valve I, is open to allow the fuel mixture to enter. As soon as the piston starts moving upward again as at B, the intake valve closes. The exhaust valve E is closed also. If both valves were not closed then some of the mixture would be pushed out through the valve openings. At C, the gas has exploded. In this case again both valves are closed. If they were not then the expanding gas would pass out immediately. The exhaust valve opens usually when the piston is at the bottom of its stroke and is beginning to move upwards.

STARTING MOTOR ON COMPRESSION

Not Difficult to Remove Cylinder Heads—Economy of Tires

St. Louis, Mo.—Editor Motor Age—In the average running of a car, is a 33 by 4-inch tire more economical than a 32 by $3\frac{1}{4}$ -inch tire, which was the original tire equipment?

2—Upon what does the starting of a car on compression depend?

3—Does Motor Age think that the cylinder heads could be removed to scrape carbon, by one who has not done this before?

4—Is there any means or device on the market for inclosing the valve tappets on a 1912 E-M-F car?—Reader.

1—Yes.

2—Upon the explosive ability of the gas under compression. The specific gravity of air is less than that of gasoline vapor.

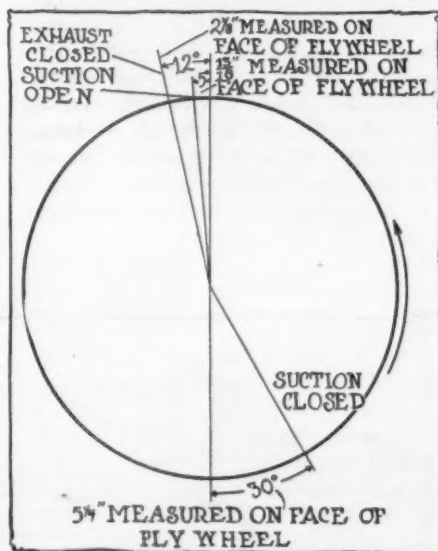


FIG. 5—FRANKLIN TIMING CHART

When a motor has been idle for some time, the air which was mixed with the gasoline has a tendency to go to the top of the cylinder around the spark plug terminals.

Now when a spark is made to occur it may have no effect upon the mixture, for the air with which it makes contact is not combustible. Hence, starting on compression depends somewhat upon the nature of the gas under compression. It also depends upon the spark. A hot spark will ignite a greater range of mixtures. Well fitting pistons and rings and tight valves also are a consideration.

3—Scraping carbon from a motor with detachable cylinder heads is not a difficult job. Scraping instructions were given in repair shop, Motor Age, issue of March 6.

4—No.

HOOSIERS WORK OUT GARAGE PLANS

Details and Costs of Modern Building in Town of 2,500 Population

Rensselaer, Ind.—Editor Motor Age—Below we give some of the details of the garage which we are now erecting on Cornelia and Cullon streets in this city. Cullen street is now the main street coming in from the north and has been ordered paved this summer, making it the only paved through street in town. This garage will be the largest in town, modern in every respect, and fireproof. Its size is 50 by 125 feet, one story, built of brick and steel. The heating plant is in the basement. The garage has one front entrance and two side entrances. We have a curb gasoline pump with underground system. The workshop in the rear is 27 by 50 feet, with a wash rack in the rear of the garage room 11 1-2 by 20 feet. Two repair pits are furnished, and in the repair outfit are autogenous welding and vulcanizing plants, drill machine, general equipment, etc., etc. In addition to the office is a ladies' waiting room and ladies' and men's toilet, an accessory window, and a show room 18 by 22 feet. We are successors to the Maxwell Garage, Maxwell Auto Co., and H. G. Shafer.

As to cost, the items are about as follows:

Value of lot.....	\$ 2,250
Cost of building.....	8,000
Livery cars.....	3,000
Equipment—	
Miscellaneous	2,415
Machinery	1,200
Vulcanizing plant.....	650
Welding plant.....	375
Curb underground tank.....	360
Total equipment.....	\$ 4,000
Total cost	\$17,250

—N. C. Shafer Co.

IOWA LAW DIFFERS FROM OTHERS

Reader Takes Exception to Statement Made in Motor Age

Spencer, Ia.—Editor Motor Age—In the issue of Motor Age, March 13, page 3, a statement is made in replying to Daniel G. Braden, which I think is an error. Motor Age says, "In every state in the Union the road law is, in passing a vehicle going in the same direction drive to the left." There is no law in Iowa to this effect. One year ago our representative tried to have such a law passed, and also that the vehicle ahead must give half the road to permit the vehicle in the rear to pass. This is of as much importance as it is to give half of the road when meeting a vehicle. The bill passed, but the Governor, for reasons best known to himself, vetoed the bill. The Iowa road law should be amended.—H. T. McLane.

You are correct.



The Motor Car Repair Shop



Tire Chain Abuse

THE abuse of motor car tires by under-inflation brings to mind another common abuse which is costing the many motorists a good round sum each year; this is the abusive use of tire chains on hard pavements. Aside from the abuse to the pavement which also is indirectly paid for out of the pockets of the motorists, the damage that can be done with chains to a pair or set of tires, in a comparatively short distance of travel over hard pavements, is appalling. This was clearly demonstrated to the writer in a recent tour through Sweden, and again in a short tour in France. In the first tour, the chains were used a whole day and a night, and part of the second day, before it was convenient to remove them; and as many towns with cobble stone pavements were passed through, and ice-encrusted roads negotiated much of the time, it was found that, on removing the chains, the rubber treads of the tires were badly gashed opposite each cross chain. In the latter tour in France, one day's use of the chains over hard asphalt pavements made several bad gashes in the tire, only one chain being used.

There are times when tire chains are essential, and every car should always carry at least one pair; but they should not be used on hard pavements. The most economical way to negotiate hard slippery pavements safely is to carry metal studded non-skid tires in wet weather, or as is the custom abroad, and a law in England as far as taxicabs are concerned, is to carry a metal non-skid tire on the outside rear wheel and another on the inside front wheel.

Box for Odd Nuts and Bolts

Every motor car repairshop has its odd nuts, bolts, washers, etc., and these generally are kept in some box or drawer, or in a series of boxes; but usually one finds these very useful little odds and ends in some series of unsuitable receptacles. As a result hours of time is wasted each week in many shops, by high-salaried mechanics, in searching through these trash-boxes. Much time, therefore, could be saved in these many shops if suitable receptacles were provided and these kept in one particular place when not in use.

In Fig. 2 is shown a very simple and substantial form of box which is used for this purpose in a large foreign factory. It is constructed of wood; and has two strong handles, as indicated, which are not in the way when searching for parts in the box. As these handles do not extend above the top of the box, it can easily be kept on a shallow shelf or in a drawer; it is a more convenient design than that type of box shown in Fig. 1.

One of the features of this type of box is that it can be very easily made from material generally to be found about the shop; and its design is so simple that but little skill is required by a workman to make a box of this kind in his idle moments.

There are many times when the foreman of a repairshop is required to go about looking for work to keep his men busy; and at such times there is no better way of filling in the hours judiciously than by repairing or improving the tools and equipment of the shop. It is at such times that odds and ends should be collected and suitable receptacles found for them.

As for nuts, bolts, washers, etc., they should be sorted; and special or separate boxes provided for each assortment; nuts in one box, bolts in another, and so on. It is wonderful how much time can be saved during a really busy season, if precautions or preparations of this nature are taken during those times when work is slack. In large shops where odds and ends that accumulate are of great number, it is even found practical to separate the different sizes of nuts, bolts, washers, etc. In one large taxicab company's repairshop, it has been found practical to employ a man to do nothing but pick up, and assort nuts, bolts, washers, cotter pins and the like.

Tire Pumping Outfit on Wheelbarrow

Owing to the fact that the inflation of motor car tires is a most laborious operation when done with a hand pump, nearly every up-to-date garage or repairshop now is equipped with or considering the installation of some sort of a compressed air system or an electric tire-pumping outfit. There are several electric tire-pumping outfits now on the market, which comprise a small electric motor, an air pump, and the necessary mechanical, electric and air connections; these in some cases are mounted on a small truck for convenient transportation about the premises.

Outfits of this nature, though a trifle

expensive to begin with, generally pay for themselves in a remarkably short time, for not only is the operation so laborious that it takes a man several times as long to inflate a tire by hand as with a power pump; but if several tires are to be inflated by hand in rapid succession, it becomes so tiring and stiffening that the workman is not much good for the rest of the day. What is more, when pumped by hand, a tire is rarely inflated to the required pressure, and knowing this, the motorist is generally most apt to patronize a garage having a good power pump in preference to a shop having no power pump.

In Fig. 1 is shown a very substantial electric tire-inflating outfit, which was seen in a large motor car factory abroad. It is comprised of a single-cylinder, air-cooled, air-pump, which is belt-driven from a comparatively large electric motor; and a rheostat or starting-box for starting the electric motor gradually and without strain. This equipment is arranged conveniently on the platform of a wheelbarrow, as indicated to facilitate moving it about the plant. There also is a long electric connection with a plug attachable to any of the electric lamp sockets; and the wires which are incorporated in a very substantial form of cable, are further protected by passing the cable through a strong rubber hose. The air-hose also is of a heavy, durable material; and a bracket and hook, mounted on the platform of the wheelbarrow, is provided to carry the coils of wire and air-hose when not in actual use. This might be called a home-made assembly and would probably cost the ordinary garage or repairshop more to make than the ready-made outfits now on the market; but as there are many shops that already have electric motors and pumps, etc., among the odds and ends of the store-room, it is possible that the above illustration might give these an opportunity of providing themselves with a very suitable tire inflating outfit at a comparatively small initial expense.

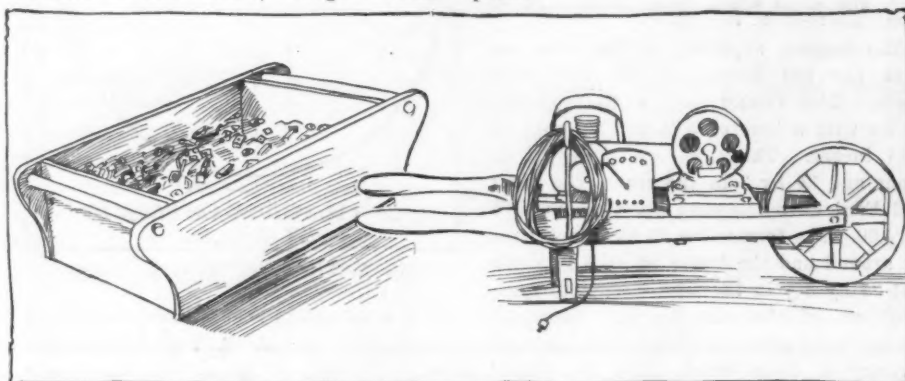


FIG. 1—BOX FOR NUTS AND BOLTS—TIRE INFLATING OUTFIT ON WHEELBARROW



Sartorial Ideas for Those Who Motor

WITH the exit of weeping April and the entrance of blossoming May, the road, which sounded only a timid call a month ago, shouts boldly now to the motorist to be off. The season for extensive touring, for delightful week-end visits to lake and mountain is upon us.

"All the world's a stage" and Nature is a busy stage manager. She is about to strike one scene and set another. It will not be long before the spring drop is hoisted into the flies and the curtain will rise on summer, the season of ultimate pleasures for the motor car owner.

Less than a century ago it was quite the thing for merry maidens to place garlands on their heads and dance about the May pole on the first day of this month, but the May pole is no more. Conservation of our natural resources came too late to save it from the wood pile of antiques. May no longer is a month for terpsichorean feats out of doors. Instead it is a time for driving, a recreation that demands smart coats as well as gay garlands of artificial flowers and diaphanous veiling.

Choosing a smart coat or becoming hat is not easy for the woman motorist. There are so many handsome models shown in the shops—all practical and good style—that making a selection is bound to be difficult. Because supplying first aid to the perplexed is the altruistic aim of this department, your attention is respectfully directed to the coat and hat from Mandel Bros., Chicago, shown in Fig. 1.

For general utility and smartness, this coat is certain to make a distinct appeal.



FIG. 2—SERVICEABLE MOTOR COAT OF DONEGAL HOMESPUN

It is made of corn color camel's hair with a leather color stripe. The convertible collar, which can be buttoned closely about the neck when the sun goes under a cloud and the wind becomes too playful, and the deep cuffs are of brown doe-skin. Full kimono shoulders; large, roomy sleeves and patch pockets, add much smartness to this garment which fastens with ivory ball buttons and tabs. The lining is of brown satin. The coat, which sells for \$50, is especially suited for town wear.

A hat that har-



FIG. 1—JAUNTY COAT OF CAMEL'S HAIR AND PRACTICAL PURPLE HAT

monizes very well with this soft jaunty coat is an imported English model with a rolling brim of purple hemp braid and a tam o'shanter crown of wistaria charmeuse. It is undraped but ornamented with a band of flowered passementerie and a small silk cluster of fruit at the back. This hat is marked \$15.

A man's coat for the motorist who either drives his own car or sits in the tonneau, is shown in Fig. 2. It is from the Hub, Chicago, and is made of Donegal homespun in both gray and tan mixtures. It is a loose comfortable garment, 48 inches in length with full skirt, raglan

shoulders. Prussian collar and slashed pockets. This coat sells for \$25.

Cut on the same lines as the double-breasted walking and driving coats of the same material, but a trifle shorter, is the covert cloth coat shown in Fig. 3. It is three-quarter length, insuring protection for the legs while the wearer is seated in his car, but has a lapel collar, making it especially serviceable for city wear. The skirt is quite full and the sleeves are loose. This coat is shown with either the slash or patch pockets, by Marshall Field & Co., Chicago, and sells for \$30. It is new this season and copied after a popular English model.

The makers of hats and caps for men finally have succeeded in turning out some very becoming models. Hats gradually are becoming more popular with the motorist than caps, because they are more practical for town wear. One of the best sellers is the silk-lined tourist shape of English tweed, with cloth band. These models sell at \$2, \$2.50 and \$3. Another popular hat is the gabardine crusher, in grey, green and brown, and selling for \$1.50 and \$2.

The newest cap is a full English shape of Scotch tweed or homespun with pleated back and long vizor. There also is a new tourist cap with outside flap for the protection of the back of the neck.

A novelty for women is a suede purse muff for spring use. It is pillow shaped and has two deep chamois lined pockets in the front, fastened by snap catches and a handsome, dull silver cabochon. The muff is bordered by buttonhole lacing and is lined with gray satin brocade.

Another novelty is a small Victoria bag which will prove very handy for overnight use. It has many pockets and loops to hold the fittings from the dressing table and large enough to carry all the necessities. It can be had in all of the most used leathers. Some of these bags are supplied with a good sized adjustable mirror that can be turned in different positions and taken out and used as a hand mirror as well.

Red leather has more admirers than ever before this season, particularly in suit cases and bags.



FIG. 3—COVERT CLOTH MOTOR COAT FOR TOWN WEAR

Wire Wheels Return After 20 Years

THERE are eight American makes of wire wheels on the market and if recent reports are to be upheld, within a short time this side of the Atlantic will see no less than twelve makers in the field. Already one manufacturer has come forward with a substantial hub, which is used in the conversion of wood-wheeled car to a wire-wheeled one. Within a short time it is expected that many more such makers will dot the field.

The distinguishing feature of the different makes of wire wheels is in the method of demounting and the type of hub used. The general principle in all the types is the same. There is an inner hub which contains the bearings. This is permanently mounted on the axle and the hub of the wire wheel is forced over the inner hub by means of some threaded device, usually a nut. The nut is used also in pulling the wheel from the axle. The locking arrangements are many.

McCue a Prominent Make

One of the prominent American makers is the McCue Co., Buffalo, N. Y., which is offering wire wheels in two shapes, double and triple cross-spoked. These types were illustrated in *Motor Age* last week in the first article of this series. Both McCue types are demountable and are made with clincher or Q. D. rims. The inner hub referred to previously is shown in the illustration of the McCue wheel, on this page. This part which contains the axle bearing, is fastened permanently to the axle. The pointed studs on the axle hub fit into holes in the wheel hub. The quick turn of a wrench is all that is necessary for the removal of a McCue wheel, and it is said that the wheel may be taken off in 8 seconds exclusive of jacking.

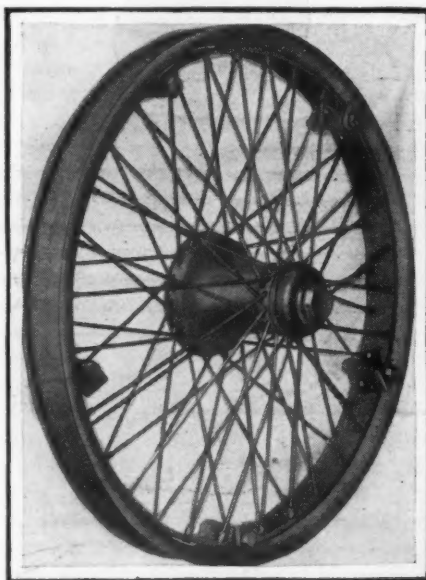
In the triple-spoked type there are seventy spokes, twenty-eight being on the outside and forty-two on the inside. This arrangement is necessary in order to make each spoke do its share of the work.

The spokes are made of wire manufactured by the American Steel and Wire Co. This company has been paying special at-

American-Made Wheels

Part II

By H. A. Tarantous



MOTT WIRE WHEEL WITH DEMOUNTABLE RIM

tention to wire wheel materials and it is due partly to its efforts that the wire wheel has such high efficiency.

In some respects the Frayer wire wheel, manufactured by Frayer, Howard & Co., Columbus, Ohio, is similar to the McCue. The illustration on one of these pages showing the inside of the hub and the axle hub, show that the latter has pointed studs which fasten into the wheel hub. There are three in this case whereas in the McCue wheel there are six. The Frayer wheel is constructed on the cross-spoke type; those spokes on the outer end of the hub crossing through and lacing from the inside of the rim. The form of lacing used on this wheel has the advantage of leaving the base for the tire smooth, so as not to interfere with applying or removing the tire. As in most cases, the

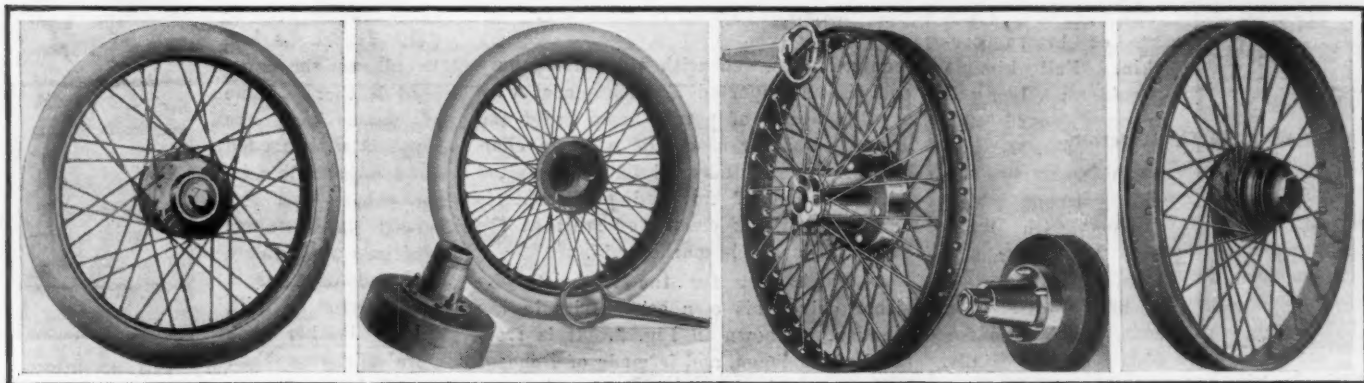
axle hub of the front wheel contains the bearing and in the rear also the mechanism to which the brake drums are attached. The exterior of the axle hubs are tapered as may be seen from the illustration, this tapered portion fitting into an opening in the wheel proper. The wheel is drawn back on the taper of the axle hub, or inner hub as it is called sometimes, by means of a nut. This nut is held in place by a latch. The application of the wrench releases the latch after which the nut may be unscrewed. With the nut off, the wheel is removed easily.

A characteristic type is the E. C. wheel, which has a demountable hub, wherein all locking mechanism is carried in the hub itself and not in the hub cap, thus eliminating injuring due to a collision. The driving mechanism of the E. C. is different than that of the other types, in that a plain hexagonal taper is used instead of the studs. An illustration in this article shows a view of the inside of the wheel at the hub. The wheel is forced into position and withdrawn by means of a lock ring. This ring is made of bronze and is turned into place by means of a special two-end wrench. E. C. wheels are made by the E. C. Sales Co., Chicago.

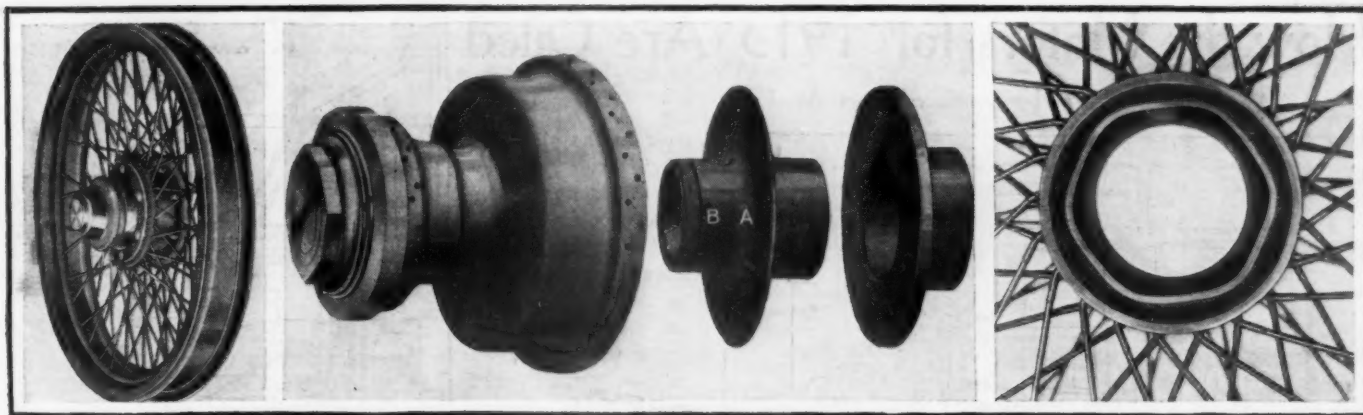
The T. J. Lindsay Co., Indianapolis, Ind., is offering wire wheels in both the steel rim and demountable wooden rim types. The latter type has fastened to the steel rim another rim of hickory, 1½ inches thick. The tire is locked on by means of six bolts and clamps. This wheel has sixty spokes, thirty on each side, and is adaptable to any standard demountable rim for wooden wheels.

Mott With Demountable Rim

A seventy-spoked wire wheel is being marketed by the Mott Wheel Works, Utica, N. Y., which is of the double spoke construction. Those wheels previously mentioned were mostly of the triple spoke type without demountable rims. The Utica-made product has a demountable rim which is removable by taking off five nuts, the time required being about 10



Types of Wire Wheels and Two Methods of Attachment. Reading from left to right—Lindsay double-spoke; Frayer, showing inside of hub, and wrench; McCue double-spoke, also inner hub and wrench; Whiteside tangent crossed spoke construction



From left to right—Hill-Standard narrow hub type; American substitution hub; hub over which American substitution may be fitted. The difficulty lies in shaping the hub to fit over the portion A B; inner plate; hexagonal taper drive of E-C wheel

seconds. There are twenty-eight spokes on the inside and forty-two on the outside, which ratio is in use on a number of other makes. The spread of the spokes at the hub is 5 inches and at the rim $1\frac{1}{4}$ inches. It was said in last week's article that great spread at the hub was necessary for the proper performance of the wire wheel, and the Mott wheel brings this out well. A feature of the wheel is that it locks itself automatically when slipped into place. The wheel itself is detachable by the use of a specially designed tool.

The New York firm headed by Robert Ashley advocates the quick detachable rim, thereby obviating the necessity of carrying a spare wheel. The parts of the rim are illustrated on one of these pages. The spokes are connected at their upper ends to the Q. D. base rim. A twist of the wrist is all that is necessary in removing the rim, only 10 seconds being required to jack up the car and take off the rim. Attaching the rim is accomplished in less time.

In Anderson, Ind., the Hill-Standard Mfg. Co. is making a wire wheel for which great simplicity is claimed. The maker states that in the event of an accident and the wheel is injured, it is cheaper to get a new wheel than to have the old one repaired. He cites the example of the block motor, which is cheaper to replace than to repair. The wheel is of the demountable type, having crossed spokes. These are seventy-two in number, thirty-six on each side. Here the spread at the hub is $3\frac{1}{2}$ inches and at the rim 2 inches, claim being made that the narrow hub thus obtained is readily adaptable to spindles equipped for wooden wheels.

Whiteside Original Construction

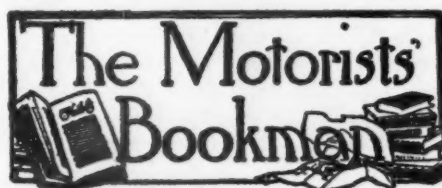
An original spoke construction is to be seen in the wheels manufactured by the Whiteside Wheel Co., Indianapolis, Ind. The spokes run off one side at a tangent and in the same direction, while on the other side the degree of tangency is the same, but the direction opposite. The illustration of the wheel on one of these pages shows the Whiteside form of construction. There are forty spokes, twenty on each side, with a spread at the hub of

$3\frac{1}{2}$ inches and at the rim of 1 inch. Like the Hill-Standard, this form gives a narrow hub. The double-spoked wheel illustrated is considered by the manufacturer to have great sidewise elasticity because of the peculiar spoke arrangement. Another feature of the wheel is the absence of screw nipples for holding the spokes, nuts or any threaded parts. The elimination of the latter, it is claimed, gives a continuous even tension of the spokes. The wheel is demountable and is made for adaption to old cars as a substitute for wooden wheels, and also for new cars.

With the rapid advance of the wire wheel, many owners whose cars are

equipped now with the wooden type, wish to have the more recent adoption. Lammert & Mann, Chicago, are furnishing the American substitution hub, illustrated in this article, which is made to fit over the hub of the wooden wheel by removing the wooden spokes. This method does not require additional bearings and uses much of the structure of the wooden wheel. Lammert & Mann manufacture the parts necessary for the conversion of a wooden wheeled car to a wire wheeled one and also issue a booklet containing instructions for the proper performance of the work of transformation.

(To be continued)



Black Hills Roads Charted

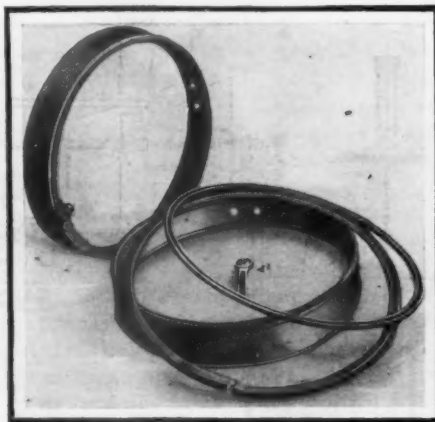
A unique and valuable route book covering the section of the Black Hills in South Dakota is published by the Dakota Engineering Co. In conjunction with the maps, which have been especially prepared for the use of motoring tourists, are many illustrations showing the topography of the country and its scenic qualities. With their many attractions of unusual pictur-

esqueness in strange rock formations, mineral springs, sparkling streams, shimmering lakes, pine forests, good roads, good hotels and absence of the pestering mosquito, the Black Hills should prove fascinating touring ground for motorists from far and near. East of the Black Hills lie the noted Bad Lands, which will be described in another booklet the same company will soon present under the title the Scenic Highway through South Dakota. The former is now ready for distribution and may be secured from the Dakota Engineering Co., Mitchell, S. D., at the modest price of 50 cents.

Motor Rambles in Italy

While touring from Milan to Rome accompanied by an Austrian nobleman-physician, Credo Harris, the author of this book, must have come under the influence of Horace and other Latin ode-dedicating poets, for he interpolates the ravings of a love-sick and spurned swain in the accounts of his travels, twenty-one letters to a hard-hearted lady by the name of Polly. After wasting two chapters in deploring his misfortunes, physical as well as cardiac, Mr. Harris finally gets under way in his love-clogged narrative and occasionally forgets the much-desired, but seemingly unattainable Polly in his contemplation of places famous in art and history and describes the scenes en route not unentertainingly.

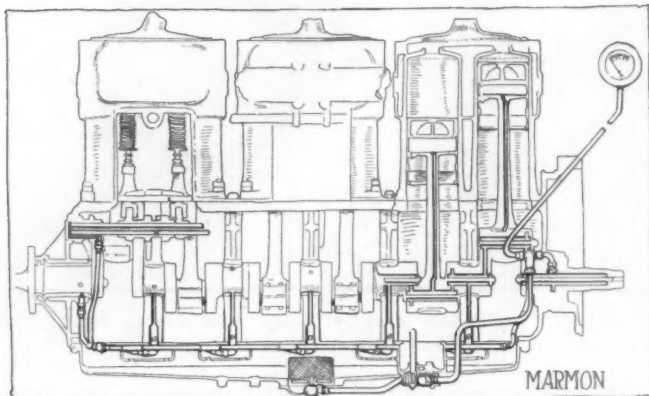
The book is from the press of Moffatt Yard & Co., New York.



PARTS OF ASHLEY UNIVERSAL RIM

How the Motors for 1913 Are Oiled

Part II—Continued from April 24



MARMON PRESSURE SYSTEM

THE Lozier oiling system as used on the large six is similar to that just described, but differs in that the splash-troughs are connected with the throttle, so that at low speeds they are tipped and their level correspondingly lowered, while at high speeds they are upright, with a higher resultant level. A separate lead conducts oil to the timing gears. The overflow from all parts of the motor is led to a settling basin before it reaches the reservoir.

Elaborate Continental System

A more elaborate form is that found in Continental motors, used in a number of American cars. In this system two vertical pumps at the middle of the crankcase deliver the oil to a dash sight-feed. From here it is fed by gravity to the timing gears at the front of the motor and to the rear main bearing. From these points the oil drains to the crankcase. The crankcase has a false bottom, the upper floor being cupped into individual splash troughs, fitted with overflows to the lower chamber or oil sump, which acts as a reservoir. In the splash pits, the oil is thrown over the interior parts by splash. The level is always at the height of the overflow openings, so that the amount of oil splashed is always the same. In the oil sump the oil collects before re-circulation by means of the pumps. Before entering the pumps it must pass through screens.

Rutenber motors are lubricated similarly. A single pump in this system is operated directly from the camshaft, drawing oil from the oil reservoir, and discharging it through an oil manifold to each main bearing and to the camshaft bearings and timing gears. The splash troughs are in the form of scoops, supported from the bottom, and having open edges, over which the oil is free to overflow. The internal parts are oiled by splash in the usual manner, steel dippers on the ends of the connecting rods assisting.

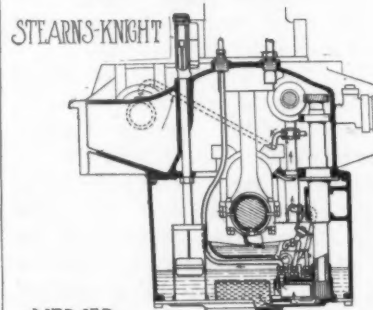
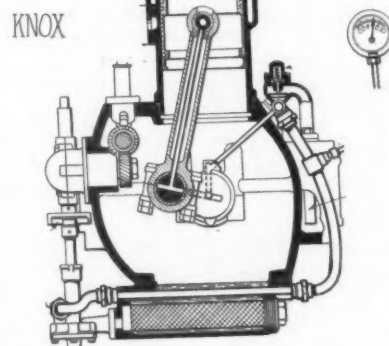
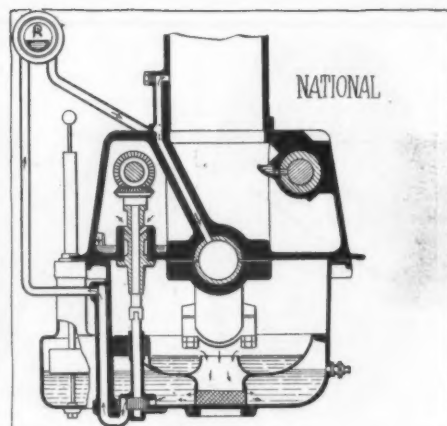
Falls motors, also employ the circulating-splash system, having a double-bottom crankcase, and an eccentric-operated pump to move the oil from the reser-

voir to the oil leads. These leads go to individual connecting-rod dipping-troughs, and to the timing gear housing. Splash cares for the oiling of each of the interior parts, the level in the splash-troughs being kept constant by means of overflow dams, which permit the excess oil to drain back into the oil reservoir in the bottom.

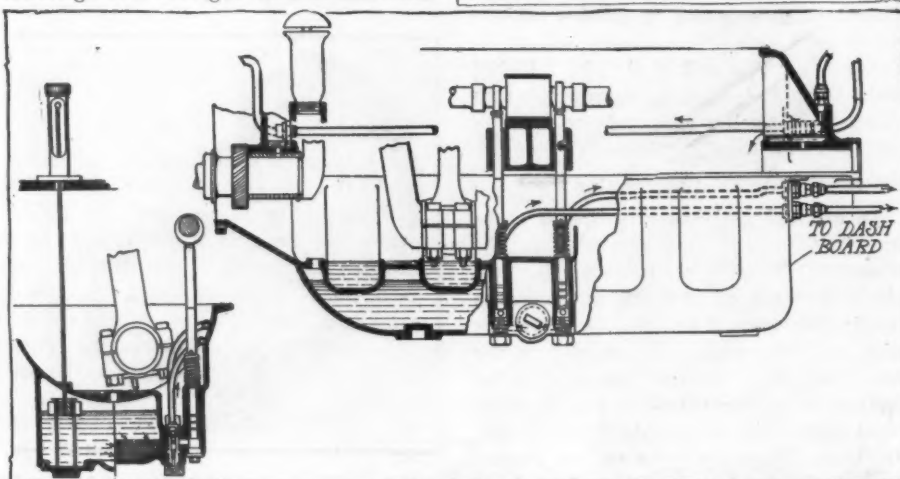
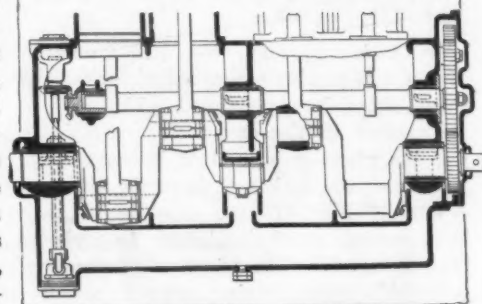
Buda motors use a similar system to the foregoing, which differs from them in that the pump supplies oil only to the main bearings. These overflow into the crankcase troughs. From here oil is splashed to the other motor parts, dippers, drilled through to the connecting rod bearings supplying the crank pins with oil. The timing gearcase is oiled by splash from the crankcase, which is caught in a cup above the front bearing. Return is through a small hole beneath it.

Brownell motors also use the circulating-splash system, the oil being carried in a reservoir below the crankcase bottom. From there the oil is drawn by a pump, and delivered through leads to the drilled main bearings. The drain from these bearings is caught by the splash-pan, and splashed to lubricate the rest of the motor.

American Scout models are provided with a circulating-splash system of lubrication of great simplicity. The crankcase is divided into four splash compartments, in which a rather high level is maintained when the motor is idle. Upon its running, however, copper tube dippers on the connecting rods pick up the oil and force it into the connecting rod bearings, from which it is thrown off in a spray. This spray lubricates each of the other parts, draining down the right walls of the crank-



MERCER



CIRCULATING-SPLASH SYSTEM ON CONTINENTAL

case. Circulation is maintained by slanting troughs that direct the drain from one compartment into the next one ahead, so that all oil eventually is carried to the front compartment. The overflow from this compartment returns through a passage cut in the crankcase wall to the front compartment. This system insures a constant circulation of oil and equal distribution to all compartments, regardless of grades.

Northway motors have a system of circulating-splash lubrication, in which the oil is drawn from the reservoir through a suitable strainer, by a plunger pump, and delivered to a dash sight-feed. From there it is fed to the crankcase. The splash-pans are of a special construction, fitted

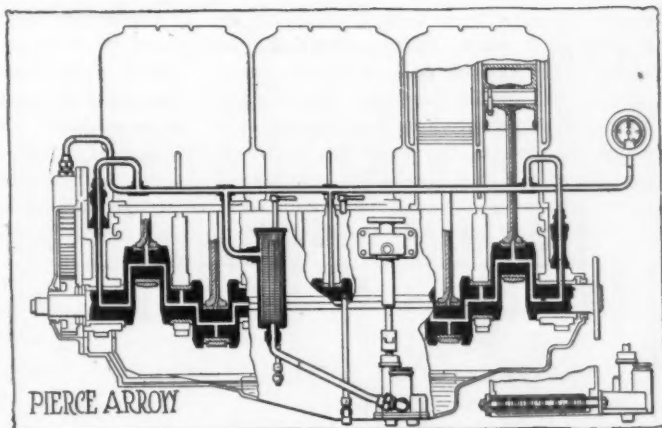
with baffle plates, to direct the oil forward. The interior of the motor is oiled by splash in the usual manner, while the oil which drains down the side of the motor is directed to the next splash-pan ahead, by a series of slanting troughs. This moves all the oil to the forward splashing, from whence it is drained to the rear one by a duct cast in the crankcase.

Circulating-splash lubrication is used on the new Lozier light six motor. The oil is raised from the oil reservoir by means of a gear pump, and forced through a dash sight-feed to each main bearing. Draining from there, the oil drips into the splash troughs, in which it is maintained at a constant level by overflow holes. Splash is used to lubricate the other parts of the motor, and the overflow from the splash-troughs drains through several screens before entering the reservoir for recirculation. The connecting rods are fitted with oil scoops which gather the oil and force it to the crank pins.

Splash-Pressure Lubrication Arrangement

An example of splash-pressure oiling is found in the National motor. A gear pump located in the oil sump delivers the oil to a pressure gauge on the dash, from which it is led under pressure to an oil trunk drilled in the crankcase. From this it is distributed by drilled leads to each cylinder and main bearing and to the timing gears. The latter drain partially through the front main bearing, and partially beneath it, back to the splash pans. The oil from the splash pans is thrown up to the wrist pins, cams and cylinders, and the drain is caught by oil cups over each camshaft, main bearing, and the vertical pump bearing, to provide additional lubrication in case of pump failure. The connecting rods are drilled at their lower ends, so that the oil that drains down them is led to the crank pins. The splash-troughs overflow through a passage which leads to a screen oil filter, so that no sediment is deposited in the oil reservoir.

Mercer cars have a splash-pressure system, in which the oil is carried in a reservoir in the sump of the motor. From here it is pumped by a gear pump to a sight-feed on the dash, from which it feeds to each main bearing. Overflowing from thence, it is carried along the cranks by centrifugal force to cups, near their ends which collect it and lead it to the connecting-rod bearings, through the drilled crankshaft. It is thrown from these bearings onto the walls of the cylinders, and into the splash pans. The rest of the motor parts are oiled by splash. The timing



NEW PRESSURE SYSTEM OF PIERCE-ARROW

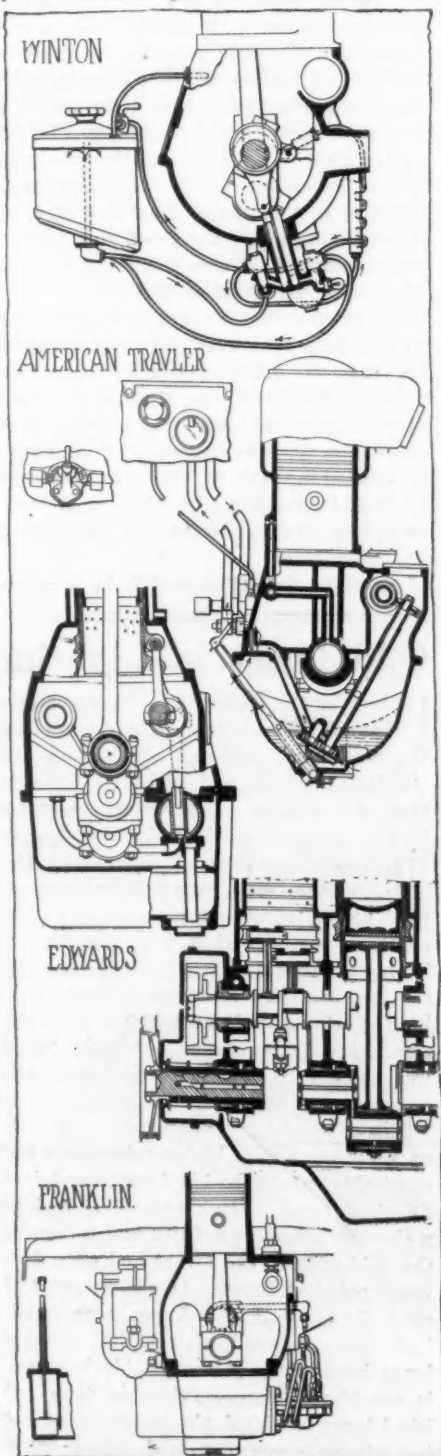
gears are fed by a small passage leading from the front main bearing to the case.

Stearns motors, in common with others of the Knight type employ the moving splash-trough, which is interconnected with the throttle and regulates the oil feed in accordance with the throttle opening. These troughs are each secured to a common shaft, which is turned by a throttle linkage, so that at wide-open throttle positions, the troughs are raised, and carry a high level of oil, while as the throttle is closed, they are dropped, so that at low speeds, the oil level is low. The shaft upon which these troughs are mounted is hollow, and serves as a feed pipe for them. It is supplied by pipes directly connected to leads from the pump. These pump leads are connected to an adjustable sight-feed on the dash. This dash sight-feed is in the form of a reservoir, from which an additional lead feeds oil at the highest speeds to the intake manifold.

Non-Splash Systems

One of the best examples of a purely non-splash pressure system of lubrication is had in the Marmon motor. The oil in this motor is carried in the sub-base, whence it is taken through a strainer by a gear pump and forced by individual leads to each main bearing. The crankshaft being hollow, the oil is taken from each main bearing and fed to the connecting rod bearings, from which it is thrown off by centrifugal force to lubricate the cylinders, timing gears, tappets, and wrist pins. Other leads direct the oil through the hollow camshafts to the camshaft bearings. A pressure gauge on the dash registers the pressure in the system. The oil which drains down the sides of the crankcase collects in the reservoir, ready for recirculation.

An example of a very elaborate and thorough-going simple pressure lubrication system is to be found in that employed on Knox motors. The oil is carried in the sump of the motor, from which it is pumped through a strainer by a gear pump, being delivered to an oil header at the side of the crankcase. This header is provided with an adjustable pressure regulator, fitted with a pressure-relief by-pass. Leads from this manifold conduct the oil



under pressure to a dash pressure-gauge, and to each main bearing. Drilled passages direct the oil from the main bearings to the crank bearings. From each crank bearing steel tubes lead the oil, still under pressure, to the wrist pin bearings. Oil thrown off the cranks by centrifugal force lubricates the cylinders and camshaft, draining back into the reservoir.

Especially notable in that it supersedes the former gravity system is the Pierce-Arrow plan, used on 1913 models. The crankcase is quite deep, so that the level is considerably below the cranks, eliminating all splash. Oil is taken from the crankcase through a screen and pumped through another screen to an oil line, carried outside the crankcase. Oil is con-

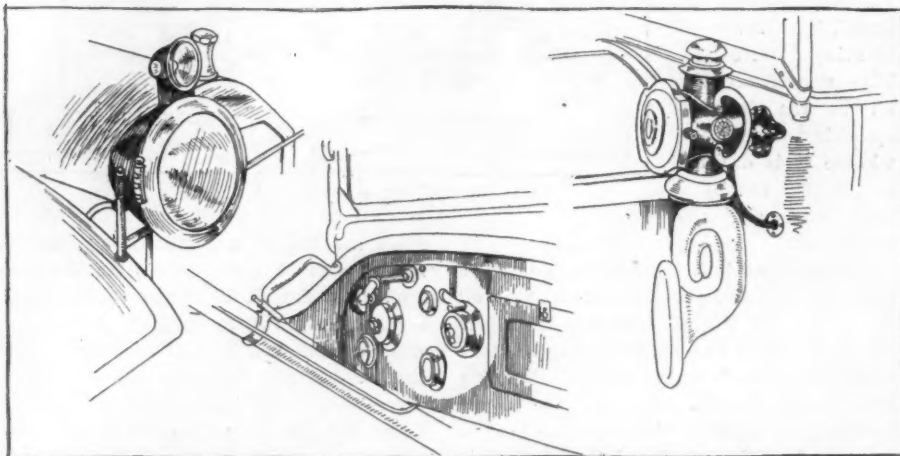
ducted by separate leads to bearings one, four, and seven, to the timing gearcase, and to the oil pressure gauge. The crankcase is drilled throughout, so that oil is led to bearings two, three, five, and six under pressure, and also to each connecting rod bearing.

From these, additional leads, secured to each connecting rod, convey oil to the wrist pins. The cylinders are oiled by seepage around the wrist pin, which projects through the piston. Oil is sprayed from the connecting rods to oil the camshafts. Surplus oil drains directly back to the crankcase reservoir.

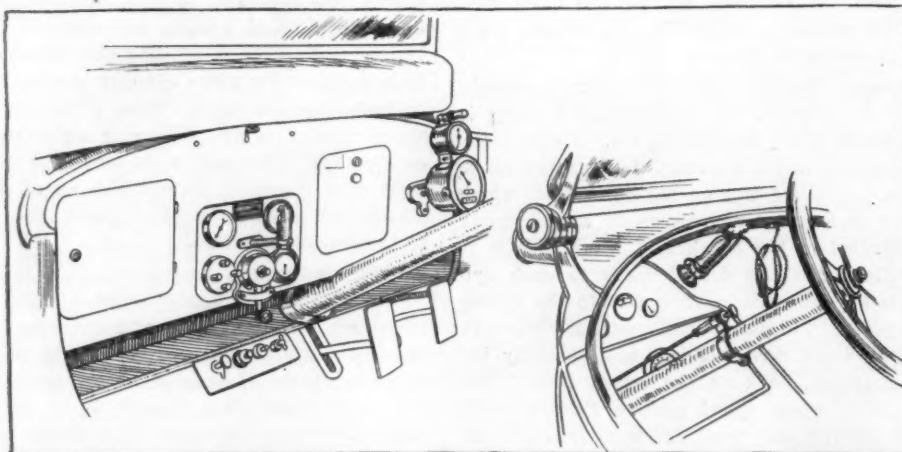
Edwards-Knight Oiling

The only Knight motor that does not lubricate by splash is the Edwards-Knight. The lubrication system employed in this motor is the simple pressure type, oil being carried mainly in the oil sump, below the crankcase. From here it is drawn by a plunger pump, and forced to an oil reservoir, high up on the side of the crankcase. From thence the oil is conducted under pressure to the timing shaft bearings, the main bearings, and the pump and magneto shaft bearings. From the main bearings the oil is led through the hollow crankshaft to the connecting rod bearings and to the chain sprockets. From the connecting rods the oil is thrown by centrifugal force on the wrist pins, sleeves, and sleeve-operating mechanisms. The oil that is deposited on the lower portions of the sleeves is carried upward by the ratchet-shaped grooves that are cut in them, and transferred to the piston through openings in the inner sleeve.

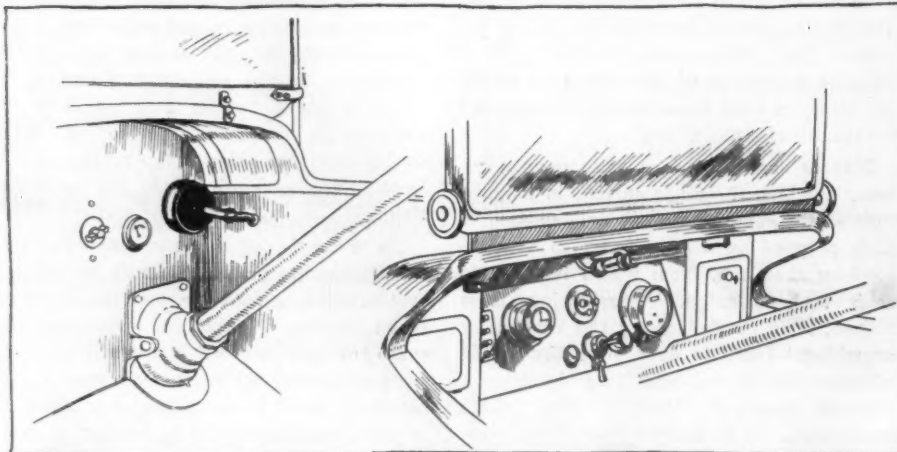
American Traveller models have a non-



Double headlight on the Hupmobile. The small lamp on the top is designed for use in the cities where powerful headlights are by law prohibited. The ball-and-socket dash light on the Premier is shown in the center. By swinging the forward portion of the bracket the entire dash may be inspected. An oddly-constructed combination oil and electric lamp as used on the Packard is shown at the right



Pierce dash arrangement at the left, showing speedometer light and light for illuminating the dash fittings. The dash fittings being centered, only one small light is necessary. The Mitchell trouble light, which is shown at the right in position for illuminating the dash, may be removed from the bracket and carried around the car when inspection is necessary



Electric dash insert lamp on Pope-Hartford is designed to partially illuminate the driver's side of the dash. Effective dash lamp on the Oldsmobile. A bulb about 6 inches long is placed under a metal shade. No light is reflected toward the face of the driver

Odd Ideas in Lighting

It is said often that it is the accessories that sell the modern motor car, and not the mechanical features. To a large extent this is true, and although little attention has been given heretofore to the lamps, this year marks a decided step toward lamp beautification.

In former years lamp manufacturers were not called upon frequently to furnish oddities in design, but with the idea of having accessories blend with the lines of the car, specially constructed lamps have been given no little amount of consideration. The bullet-shaped headlight which was popular in 1911 is passing gradually as a point of admiration.

This type of lamp has become too ordinary for use on the higher-priced cars and a suitable substitute has been found in a flat-sided lamp. Black enamel is making a slow departure as a finish and is leaving the field open to the nickel and once dominant polished brass. At the recent Chicago show the Pierce-Arrow cars exhibited were equipped with highly polished brass headlights. Although black enamel is considered more serviceable than polished brass or nickel, the monotony of seeing almost every car with black lamps

splash lubrication that is not quite a pressure system, although the effect is the same. The oil is carried in the sump of the motor, and elevated from thence by a gear pump to a sight-feed on the dash. From this sight-feed it feeds by gravity to the cylinders and to each main bearing. The oil that is fed to the cylinders lubricates the pistons until they reach the top of their strokes, when it is allowed to fall upon the connecting rods, which are drilled to receive the oil.

After passing over the crank bearings, the oil is thrown off by centrifugal force in a spray which lubricates the camshaft, wrist pins, etc., finally draining through screens into the oil reservoir. A novel feature is a drain control, located at the side of the crankcase which enables the operator to drain any excess above the maximum level, or the entire oil system, by the manipulation of a single lever. A dash adjustment is provided for the oil feed.

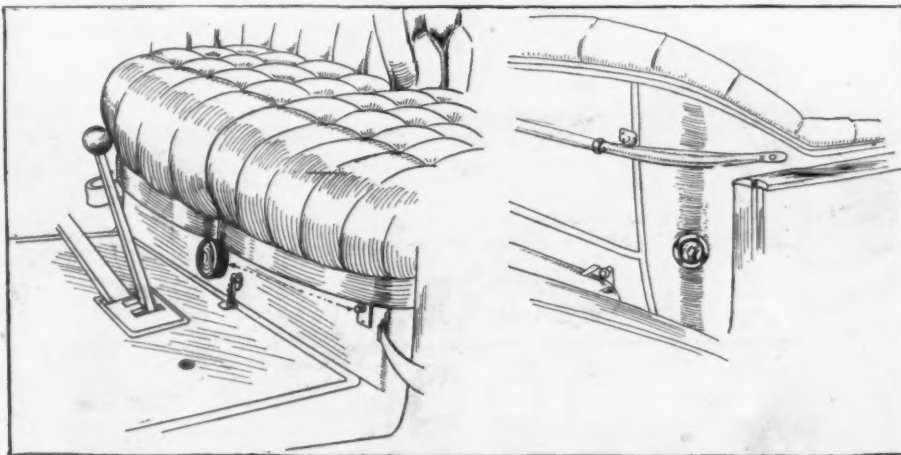
Oiling in Franklin

Franklin lubrication is of the non-splash simple pressure type, the oil being elevated from the oil reservoir at the bottom of the motor, by a gear pump, and forced by individual open leads to each main bearing. Drilled passages in the crankshaft conduct it from these bearings to the crank bearings. Centrifugal force throws it from the cranks to the cylinders, wrist pins, camshaft, and pump gears, whence it drains through a fine-mesh screen back to the oil reservoir. A separate lead conducts oil to a sight-feed on the dash which serves as a tell-tale for the pump.

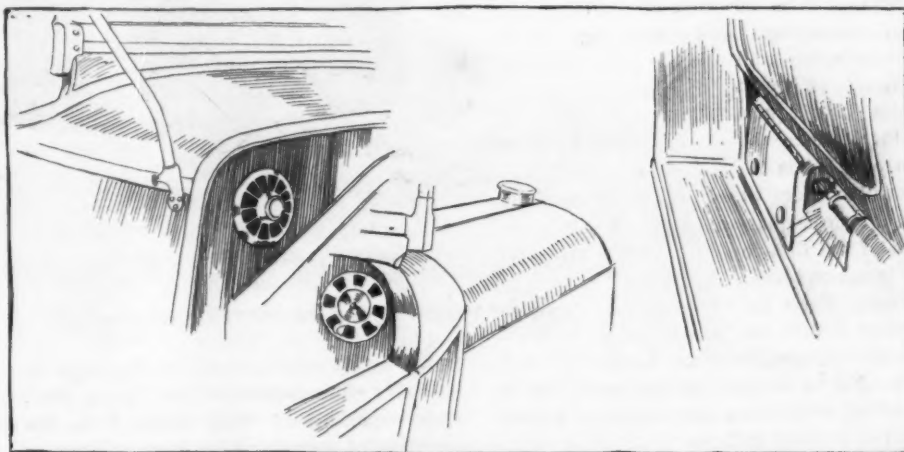
No splash is used in the lubrication of

the Winton motor, the oil being carried in a reservoir at the side of the motor. A pump draws the oil from this reservoir, and delivers it under pressure to each main bearing. Passages drilled in the crankshaft conduct it from there to the connecting rod bearings, from which it is thrown off by centrifugal force to lubricate the

other motor parts. Below each crank is a bowl-shaped chamber in which the oil that drains down the sides of the crankcase collects. An oil manifold connecting these, directs this drained oil to a second pump, which forces it back through a strainer into the reservoir, to be again started on its path.



To the left electric dash light on Marmon. The button for operating the light is within easy reach of the driver. It is shown at the end of the dotted line. The floor of the forward compartment is illuminated also. The illustration at the right shows the door light on the 1913 Stoddard-Dayton. Upon opening the door the passage-way is illuminated and the light shut off when the door is closed



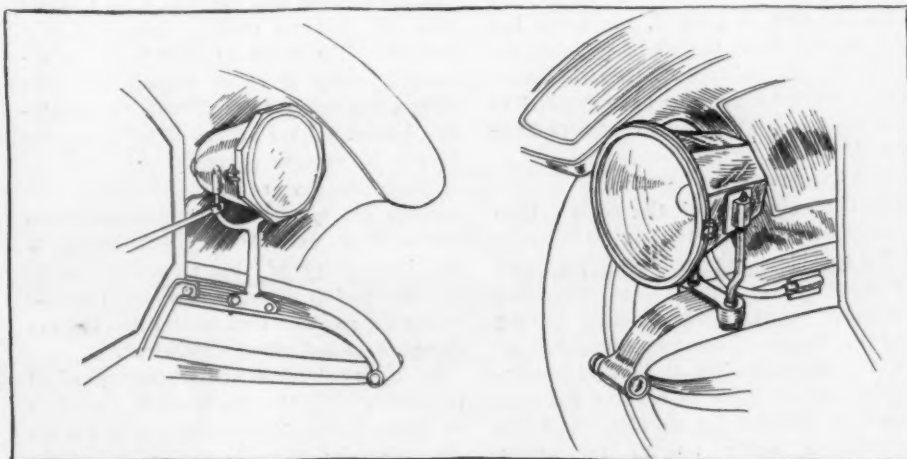
Stoddard-Dayton electric dash-insert lamp at the left. A ventilator is part of the lamp housing. Both front and rear views are shown. The Stearns company has a shaded step light on its new models similar to that shown at the right. It becomes operative when the door is opened, and lights part of the road as well as the step board. By closing the door the light is turned off

The Modern Motor Car

tempts the car manufacturer to discard the solemn looking variety.

Necessity, the mother of invention, has come to the front and under its influence the dash insert lamp has made rapid strides. The conventional side lamp, suspended upon a bracket, is stolen easily, but the dash insert lamp requires not only a long time, but skill, for removal. In one case a ventilator is made part of the lamp, thus coupling beauty with efficiency of service.

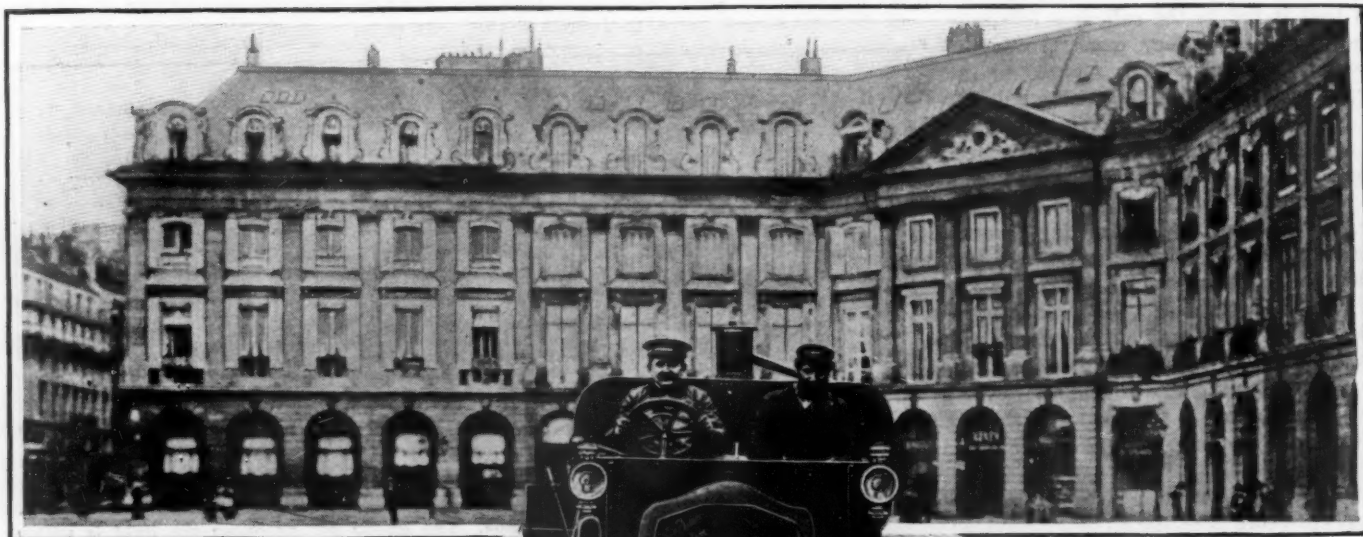
The motorist of old had to get beneath his car and lie upon his back perhaps to locate trouble, but with the introduction of the trouble lamp an inspection of the car may be made by one other than a contortionist. Trouble lights appear this year in innumerable forms, each adaptable to the motor car to which it is attached. In a few instances the trouble-finder is made to illuminate the dash while the car is running. That dash lighting is a necessity is evident when it is remembered that the clock or speedometer are looked at often at night. The illustrations on these pages show that car manufacturers have paid no little attention to details of lamps and lamp fittings.



Eight-sided, polished brass, electric headlight to be seen on the Locomobile this year. It brings out the tendency toward exclusiveness. On the right is shown another oddity characteristic of the Pierce-Arrow. A deviation from the ordinary bullet type of headlight. It is finished in polished brass

Paris Banishes Horses for City Cleaning

Development of Municipal Motor in Paris



It is part of the world's economy that the horse should disappear from the work of cleaning, sweeping and watering the streets and avenues of great cities. This is quite natural, for the horse itself is responsible for at least three-quarters of the dirt to be found on paved streets. Paris has proved it with the Champs Elysees, the motor section of which never has to be washed and rarely has to be swept, while the adjoining alleys have to receive a daily toilette.

Paris is the first city to make use of motor vehicles for street cleaning to the entire abandonment of the horse. The change is not yet complete, but in five of the twenty arrondissements or wards into which the city is divided, the horse has gone entirely from the street cleaning department. The other districts either have made a partial change or have decided to convert as soon as present contracts have expired.

Paris Experiments

The determination of the correct type of machine for street cleaning necessitated a considerable amount of experiment. It was not merely a question of connecting up a motor to a four-wheel chassis driving a rotary brush. This was attempted at first, the city purchasing light, low-powered rotary sweepers to replace the one-horse rigs in use for so long; and big motor-driven water wagons for street sprinkling.

It was found that the former raised as much dust as they swept, and that the

latter only could be used to advantage in specially wide avenues a few days a year. This experimental work resulted in the adoption of a combination type of sweeper and sprinkler, capable of service throughout the year, wet or fine, rain or snow. The eighth ward, which is the most fashionable district of Paris, comprizing the Champs-Elysees and the Place de l'Etoile was the first to make a complete conversion. The work in this ward is accomplished by seven de Dion-Bouton machines, replacing from fifteen to twenty-five horses. Other makes of machines are in use in various parts of the city, but de Dion-Boutons are in the majority. Under the old system the number of horses was a very variable quantity, owing to the inelasticity of this method. During spring and fall fifteen horses could do the work; in summer and winter twenty-five horses were not always sufficient.

Taking the eighth district as typical of the entire city, the day's work comprises 10 hours, the machines going out at 4 a. m., stopping for 2 hours in the middle of the day, and entering the depot at 4 p. m. The same man is kept in charge of each machine and only skilled drivers are em-

ployed, men having had experience with gasoline trucks being preferred. Drivers of the old horse rigs are not trained to handle

motor sweepers. The nature of the work varies largely according to the weather, the task given to each driver being chosen by the overseer.

Street washing generally is undertaken during the early morning. The tank is filled from the street-mains and the 570 gallons of water pumped out; with the pump working at full force the tank is emptied in about 10 minutes, during which time the machine is run at a speed of $7\frac{1}{2}$ miles an hour. After swilling with water it is customary to leave the street about an hour to allow the mud to soften.

Other Methods Used

Another method is to flood the streets direct from the mains, then send the machines over later for sweeping only. This thorough washing only takes place from once to three times a week, according to weather conditions. It gives an absolutely clean surface with a single passage of the brush. Watering with the front sprinklers at full capacity, the tank is emptied in about 15 minutes, the machine during this time running at a speed of $7\frac{1}{2}$ miles an hour. This means that the machines will water over a width of 50 feet for a length of nearly 2 miles on one tank load of water.

The majority of the work, however, consists of street sweeping. This is done on a width of 67 inches, at a speed varying

ONE OF PARIS' MOTOR SWEEPERS AND SPRINKLERS AT WORK

from 5 to 8 miles an hour, according to the condition of the road surface.

Experience has shown that with a brush traveling at this speed, a large amount of dust is raised in dry weather. To prevent this, each machine is fitted with a central sprinkler just ahead of the brush, thus slightly damping the street surface and effectively preventing the raising of dust.

Method of Operation

With the pulveriser working only, one filling of the tank is sufficient for 4 or 5 hours. During the 10 hours on the street, each machine covers a distance of 38 to 45 miles. This average is based on the work of the seven machines employed in the eighth ward. One of the most important advantages of the motor sweeper over the horse variety is that owing to its increased speed it does not interrupt the normal flow of traffic. With an average of 3.8 to 4.5 miles an hour for a full day, including stoppages for filling tanks, etc., it is evident that the normal running speed must be in the neighborhood of 7 miles an hour. The maximum width of roadway watered at one operation is 50 feet. As the ordinary Paris streets vary in width from 23 to 40 feet, they can all be covered at one operation. The boulevards and specially wide avenues, such as the Champs-Elysees, of course require several operations.

For reasons of economy, benzol is used exclusively in place of gasoline. Except in the matter of price, it has no advantages over gasoline; indeed it is found to foul the motor a little and to necessitate pulling down at more frequent intervals. The average amount of fuel used is 46 gallons per day for a fleet of seven motor sweepers. Taking an average of 40 miles per machine per day, this works out at an average of 10.7 miles per gallon. These figures are taken on actual working conditions extending over several weeks, and not on a short experimental run under favorable conditions. Each brush lasts on an average of 3 days, or a distance of 120 to 130 miles. At the end of this time it is so far worn down as to be of little use,

and is then sent to the city brush factory for the bristles to be replaced.

According to the Paris municipal authorities, the economy by the use of motor street sweepers is from 12 to 14 per cent over the same work done with horses. The authorities of the city of Versailles declare that an economy of 50 to 60 per cent is obtained. Versailles has the advantage over Paris, however, of possessing exceptionally wide, straight avenues with very little traffic, thus allowing the machines to work constantly at their maximum efficiency. Paris is one of the most crowded cities in Europe, and except in the early morning the sweepers cannot work to their full capacity.

The de Dion-Bouton sweeper and waterer is a machine with a motor under a bonnet, the driver behind, and water tank on the rear platform. The brush is placed diagonally across the machine, between the two axles. The motor is an ordinary type of four-cylinder cast in pairs, the bore and stroke being 3.5 by 4.7 inches, and the nominal horsepower 18. Control is reduced to the operation of a throttle. Lubrication being under pressure, there is only an indicator to watch.

Mechanical Details

So far as the drive is concerned, the machines follow the general de Dion-Bouton design. There is a plate clutch, three-speed gear box and transverse cardan shafts to the rear wheels. These latter are fitted with twin rubber tires, the front wheels having single rubber bandages.

There are four main water outlets to be used according to the different classes of work to be undertaken. At the rear is a transverse sprayer through which the water flows by gravity on the opening of a cock. This is only made use of in narrow streets having insufficient width for the front sprayers to work to advantage. From the pump, at the extreme rear of the chassis, there is a left and right-hand main feed pipe passing under the chassis and going to the circular section sprayers projecting beyond the front of the frame.

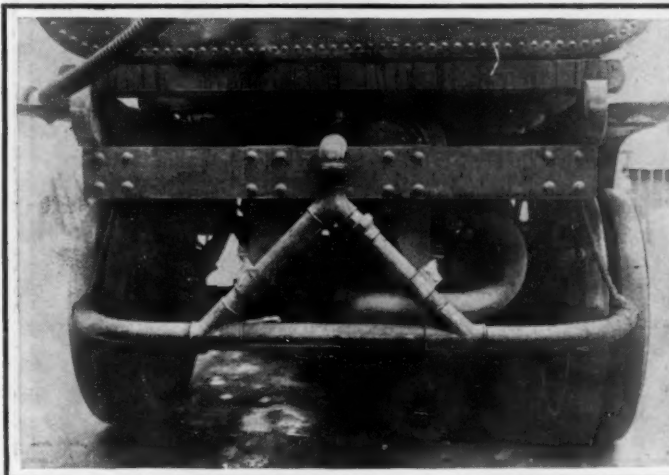
On each feed pipe is a bypass for the washers, these being branches from the main pipes with their extremity near the ground, just ahead of the brush, and fitted with a valve which can only be opened by the driver getting down from his seat. Also on one of the main feed pipes is a bypass to the pulveriser, this being a fine spray nozzle near the ground and just in front of the brush.

Mechanism on Subframe

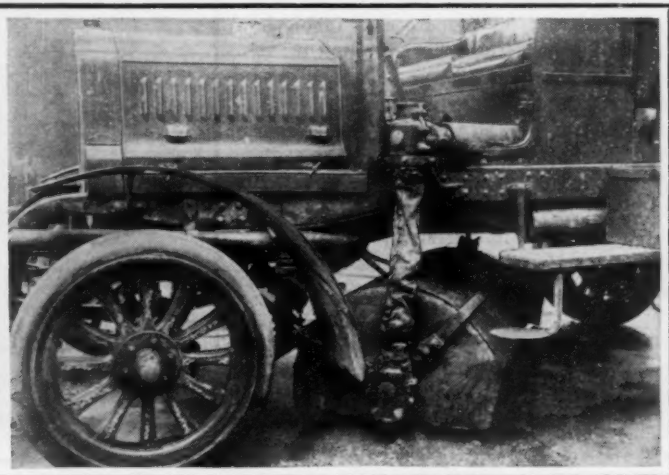
The whole of the mechanism is carried on a sub-frame the full length of the main frame, and it is at the end of this sub-frame that the centrifugal water pump is mounted. The pump is driven by a propeller shaft having a sliding pinion on its forward end brought into engagement, by the use of a lever, with one of the gearset pinions. The operation practically is the same as changing gears. With the pump working, the operator withdraws either one or both of the piston valves at the inlet end of the two main delivery pipes. This delivers water to either left or right-hand pipes, or both.

If street watering has to be done, the piston valves in the front sprinklers are withdrawn, either together or separately, admitting the flow to the sprayers. These sprayers are cylindrical housings, having a series of fine holes on one-half of their circumference. On the outside of the cylindrical casing is a semi-circular guard which can be rapidly made to completely or partially cover the outlet holes. The two guards have separate control.

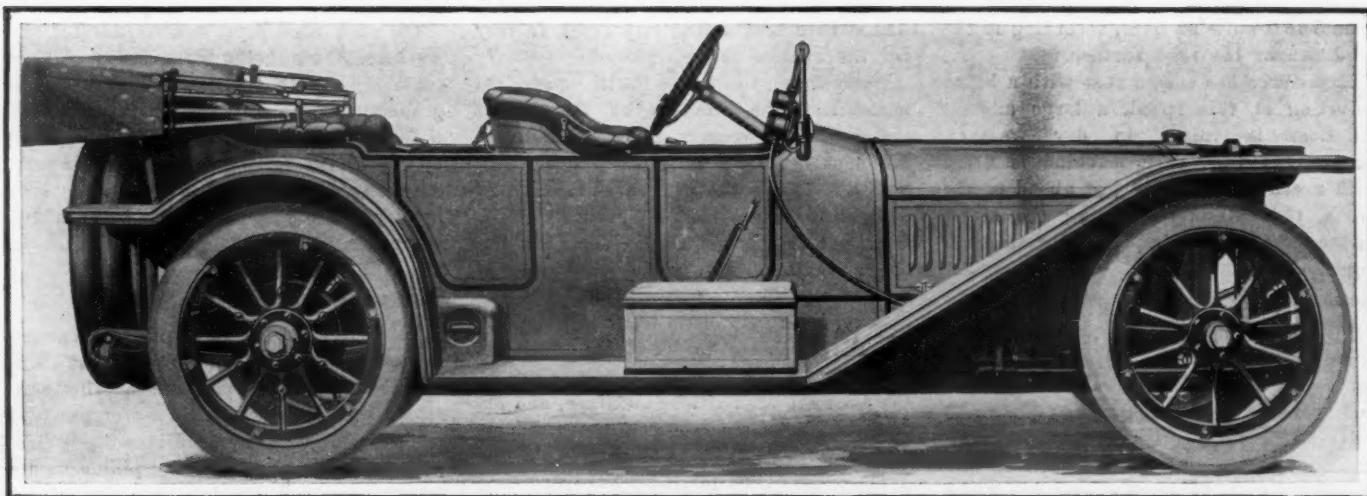
Although somewhat complicated to describe, the operation of the machine really is simple. The water pump is engaged by means of short lever on the right hand side of the driver's seat. Pivoted at the base of the dash board are four levers. Two of these operate the piston valves at the inlet end of the main feed pipes, and the two others a similar pair of valves at the sprinkler end. These four being opened to the required degree, the operator confines his control to the guards to prevent splashing of foot passengers.



SHOWING TRANSVERSE WATER PIPE USED ONLY IN NARROW STREETS



TRANSVERSE BRUSH AND DRAINING MECHANISM ON PARIS MOTOR STREET SWEEPER



LITTLE SIX MODEL OFFERED FOR 1914 BY AMERICAN MOTORS CO.

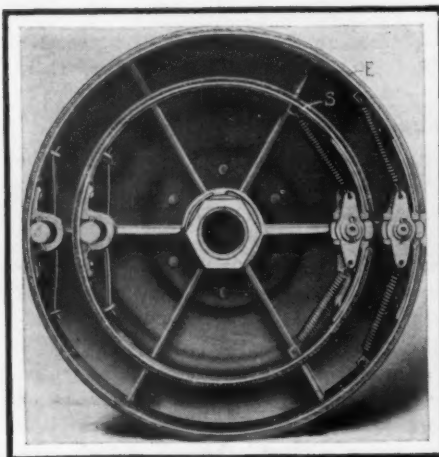
American Features Little Six for 1914

THE little six is the feature of the new line announced by the American Motor Co. for 1914. A big six-cylinder car of similar lines is offered, together with a four-cylinder roadster. All have under-slung frames, a feature of American cars for some time past. The little six is known as the 644 from the fact that it has a six-cylinder motor and has a body capacity of four passengers. The big six comes to us as the 666 with a six-passenger body, and the four as the 422, with a roadster body.

Although all three are new cars, the two sixes are of quite the same design, but the American Motors Co. heralds the little six as their leader. The rapidly increasing demand for this type of pleasure car, together with the call for little sixes at the present time when photographs only are available, has led the American Motors Co. to believe that their pet has created a sensation over the country.

On the dynamometer the motor of the little six will show 60 horsepower, but the S. A. E. horsepower tells us that it will develop but 38.4, with its 4-inch bore and 6-inch stroke. The six cylinders are of the T-head type and are cast in block, thus pulling hard for a lower selling price. Simplicity has been always an aim of the manufacturer and the little six is given the benefit of all the ideas of simple construction that the American Motors Co.'s engineers could devise. The intake header, water and oil passages are made part of the motor, thus eliminating the added cost of extra castings and the necessary complications that set in with this form of construction. The integral casting of many parts does away also with the unclean appearance prominent in many motors with separate parts.

Four plain bearings support the crankshaft and for the coming year the bearing surface has been made exceedingly large, giving added assurance of long life. On



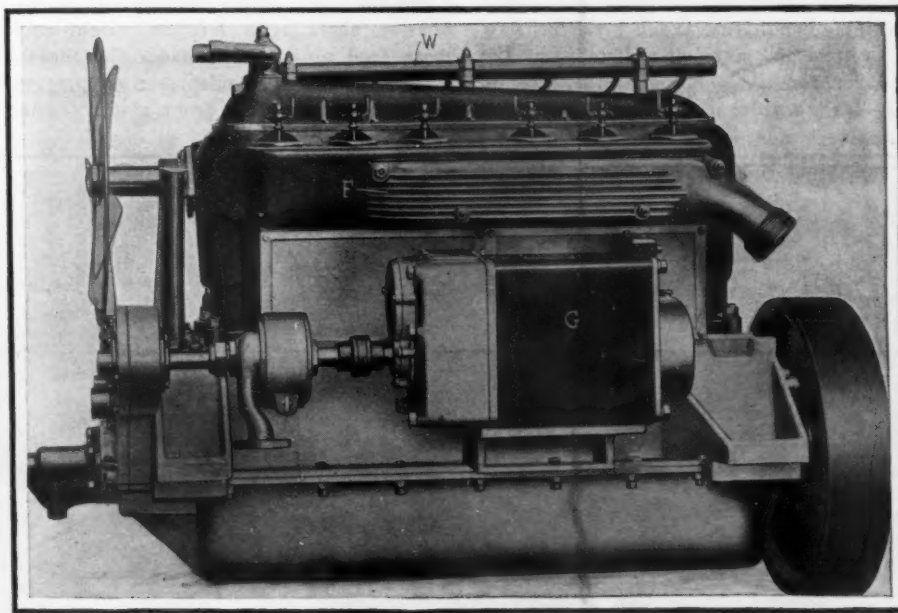
HAND BRAKE E, FOOT BRAKE S,
the right side of the motor is the carbureter. The intake valves are of course

on the same side, and the exhaust on the opposite side, as T-head construction dictates. The magneto is on this side also and the wires leading from it enclosed in a pipe over the cylinders. This pipe is designated in an illustration of the motor on this page.

On the left side of the engine is the lighting and starting generator, which is operated by shaft geared to the motor. The shaft of the generator is connected first with the water pump shaft, as may be seen from the illustration of the left side of the motor.

Oiling is by splash, except in the case of the main bearings. These are oiled by gravity, a sight feed on the dash of the car showing at all times the amount of oil being fed to the bearings.

The fan for auxiliary cooling is operated by belt, which is revolved by pulley at the



EXHAUST SIDE OF MOTOR
Starting and lighting generator G, exhaust pipe fins F, and wire conduit W

end of the magneto shaft. The magneto resting on an aluminum stand makes the belt drive to the fan very short.

A cone clutch drives through a universal to a four-speed selective gearset. The pitch of the gears is greater than has been used heretofore, the wider gear giving longer and quieter service. The gearset is located amidships. Directly behind it is another universal and the drive is completed through it and the drive shaft. The latter is inclosed in a torsion tube which spreads as it reaches the pressed-steel differential housing. The rear axle is of the floating type.

The brakes are concentric, as may be seen from the illustration shown on the opposite page. The drums are unusually large, for the reason that the little American uses wheels of large diameter. These wheels, which are 38 inches, require more braking surface than the smaller wheels. The wheels carry 38 by 4½ tires.

The steering is of the worm and gear type and is situated on the right side of the chassis. The control levers are on this side also. Both rear and front axles operate on ball bearings. The latter is of the I-beam section variety.

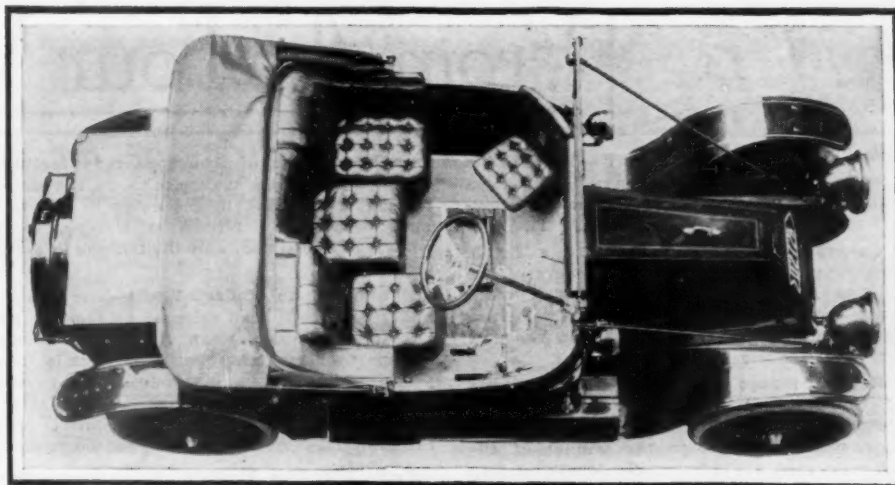
Factory equipment includes the regular appurtenances, the feature being the storm curtains. Usually the celluloid curtains crack as they are folded and placed under the rear seat. The curtains supplied with the American cars are folded, but the celluloid remains flat.

DISCUSS CHASSIS TESTING

New York, April 24—P. P. Dean, at the meeting of the metropolitan section of the S. A. E. tonight, read a paper on chassis testing apparatus, the idea being to bring out and encourage discussions on the possibility of eliminating road testing of motor cars and instead install suitable stationary testing apparatus. The work of the tester is hampered somewhat by local laws due primarily to the excessive speed at which these men operate the motor cars.

Mr. Dean, who is with the Diehl Dynamometer Mfg. Co., stated advantages of the rack test over the road method, among which were that the former affects a tire saving; that the speed may be measured under various loads; the actual horsepower at the rear wheels may be measured; power variations due to carburetor adjustment may be more accurately noted; one operator may test a number of chassis and record the results of the tests. These are a few only of the advantages which Mr. Dean claimed for shop testing of chassis.

Professor Marshall stated that one great objection to the laboratory method of testing chassis, is that wind resistance is not taken into consideration and that this would amount to as much as 20 per cent of the total resistance to progress at the higher speeds. The loss through the tires is an important factor.



SPECIAL BODY DESIGNED FOR SPORTSMAN

Riding to the hounds astride a spirited hunter and lying in wait for wild geese and ducks in a damp blind may be rare sport, but W. L. Elwood, of DeKalb, Ill., will have none of it. Both an enthusiastic nimrod and motorist, the scion of the famous barb wire king has had a special hunting car built for him by the Chicago agents for the Franklin in which he hopes to equal the speed of Mercury in pursuit of pleasures in which mythologists tell us Diana was most fond.

With a driver and two companions, Mr. Elwood, who owns a large ranch near Plainview, Tex., is now following the game trails of the Lone Star state in the special car which was shipped to him from Chicago last week.

As the accompanying illustration shows, the car is of the runabout type and has a body large enough to comfortably seat four persons. On the right hand side there is also room for three compartments for food, shells and other equipment of the huntsman. In addition, extra lockers have been placed on the running boards.

Use Gas Instead of Gasoline for Testing

NEW YORK, April 28—By using illuminating gas for motor testing, the manufacturers of motor cars will save at least \$1,750,000 a year. This statement was made at the meeting of the fuel investigating committee of the S. A. E. held here. The factories consume approximately 3,000,000 gallons of gasoline each year for the purpose of testing motors and this volume of fuel has a suitable substitute in illuminating gas, such as is used for house lighting.

A number of the more prominent motor car manufacturers, principally in the big centers of Detroit and Cleveland, either are using or are making preparations for installing city gas in their test rooms. In some instances the gas companies are furnishing special mixing devices to supplant the carburetor, in other cases the carburetor itself is used, with slight adjustments and with the fuel inlet at one of the air ports. With gas at 65 cents per 1,000 cubic feet, the saving to motor car manufacturers will approximate 50 per cent in the fuel bill. In Detroit illuminating gas is piped at 45 cents per thousand and in that city the saving will be proportionately greater.

The fuel problem has so gripped the manufacturer that in one instance, in order to affect a saving in the yearly fuel bill, the installation of a gas-producer plant is being considered with all seriousness.

It is the object of the fuel investigating committee of the S. A. E. to secure an abundance of fuel adaptable to the motor and at a price sufficiently low to permit of its being used by car owners. Inasmuch as the fuel situation is being discussed over the country, the S. A. E.

engineers are working independently and part of their plan is to examine and test appliances and products that will materially increase the available economic fuel supply.

LOCK LITIGATION ENDED

Hartford, Conn., April 28—The suit brought by the Yale & Towne Mfg. Co. of Stamford, Conn., through the United States district court for the southern district of New York against the General Automobile Supply Co., Inc., and Smith-Haines, New York city accessory dealers, is considered as practically ended. The makers of the Yale lock charged infringement of the Yale trade mark. Both defendants have declared that they supposed the Lynch Yale lock buckle and the Yale lock principle buckle which they sold, the former handled by the supply company and the latter by Smith-Haines, were genuine Yale products. They have signified a willingness to cease marketing the alleged infringing devices. Since the Lynch company which produced the devices has ceased manufacture, a decree pro confesso or judgment by default will be entered against each defendant and the matter ended. Litigation began about a month ago.

GUAYULE PLANTS ENLARGING

Torreon, Mexico, April 26—Manufacturers of crude rubber out of the guayule shrub in Torreon and tributary section are preparing to greatly enlarge their operations as soon as the present chaotic condition of political affairs in this part of Mexico is improved. The price of guayule rubber is now double what it was a year ago.



From the Four Winds



ATLANTA Hill-Climb May 17—The Atlanta Automobile and Accessory Association will hold its annual hill-climb on the Stewart avenue hill, Atlanta, Ga., May 17.

Corona Plans Race Meet—With a 3-mile speedway nearly completed, members of the Corona Automobile Association of Corona, Cal., have started a campaign for entries for the race meet to be staged on the new track September 9.

Rayfield Hangs Up Trophy—Manufacturers of the Rayfield carburetor announce that they will give the Rayfield trophy and a cash prize of \$1,000 to the winner of the 500-mile race at Indianapolis Memorial Day provided his car is equipped with their carburetor.

Park Opens June 21—The Mt. Tacoma National park will be formally opened to tourist travel this season on Saturday, June 21. By that time the highways in the park and leading to it will be in splendid condition. Pierce county has donated \$12,700 toward the improvement of the route to the mountain and a like sum has been appropriated from the forest reserve fund.

Uruguay Has 2,000 Cars—There are 2,000 cars in the republic of Uruguay, a recent official report says. Of this number 1,300 are licensed in Montevideo and the remainder scattered throughout the country. Cars are entering the custom house at the rate of fifty a month. About one-half of the

cars in use are of American manufacture. American cars are declared to be the more popular, but owing to the delay in delivery many orders are placed in Europe, from where, it is claimed, shipment is made more promptly.

Pathfinder to Blaze Trails—The Pathfinder has again been selected by the touring bureau of the American Automobile Association to blaze transcontinental trails this year. Three more ocean-to-ocean routes will be surveyed this season. The Fisher-Allison highway, the Trail-to-Sunset and the Midland-Northwest trails will be routed.

Prize For Tire Trouble—As a consolation award, the Delaware Automobile Association has offered a special prize for the entrant having the most tire trouble on the average time run from Wilmington to Dover and return on May 24. The other prizes will be for the ones making nearest the average time of all the cars on the round trip and on the trips each way.

Car Owner Not Responsible—An owner is relieved of all responsibility arising from damages caused by his car if the car is driven by some party who is officially and authoritatively in charge. This point was established in a judgment handed down by Judge Panneton in the case of Arthur Lajeunesse against C. S. Perkins at Montreal. Lajeunesse had been knocked down and badly bruised by Perkins' car and

claimed damages for \$390. His action was dismissed because when the accident happened the car was in charge of the owner of a garage and repair shop, who was trying the car in order to test the effectiveness of some repairs he had made.

Gophers May Save Tag Fee—Unless there is a special appropriation at the extra session of the legislature next fall, the motor car department of Minnesota promises to go out of business January 1, 1915. The legislature meets regularly every 2 years, but the governor will call a meeting in the fall to make public utilities laws and the appropriation may be included in the call. The proposed Dunn law failed to pass and, expecting its passage, the legislature failed to make an appropriation. The secretary of state said no tags will be issued after the date named unless action is taken.

After Glass Throwers—The law relating to throwing glass on the Massachusetts highways has just been amended so that now there is a penalty of \$50 fine or 30 days imprisonment, or both, for doing it willfully in the Bay state. Under the old law the only charge that could be preferred was that of throwing refuse into the street or committing a nuisance, and this meant a reprimand or small fine.

Ohio License Demand Heavy—Despite the recent flood, the demand for motor car licenses in Ohio is breaking all records. The number of licenses issued since January 1, 1913, is in excess of 60,000 and applications are coming in at the rate of 600 daily. If the present demand keeps up, Registrar Shearer will have to amend his estimate of \$5,000 for the present year as the number will mount above the 100,000 mark.

Offers Economy Rewards—To encourage drivers of privately-owned Napier cars to secure the best possible results at the least possible running expense from the machines which they operate, the Napier Motors, Ltd., of London has instituted a competition in which it will make awards of \$750 for records showing average costs per mile made up as follows: First, on repair charges, and, second, on running cost, including gasoline and oil consumption, tires, etc. The competition opened April 15 and will close October 15.

New Motor Law For Texas—A favorable report by the judiciary committee of the senate will probably result in a new law regarding the taxation of motor cars in Texas. The tax will be levied by registration methods, according to the horsepower of the car, and the registration will be furnished by the state free of cost. The act provides for a fee of \$8 on all cars under 20 horsepower and 40 cents for each additional horsepower. The bill also increases the maximum speed limit from 15 to 25 miles an hour.

May Lift Motor Embargo—The Canadian government has introduced a bill to repeal the present law in force for several years totally prohibiting the running of motor cars on Prince Edward isle. It is now proposed to let them run only on Monday, Wednesday and Thursday of each week with very stringent regulations. Chauffeurs must be licensed, the fees going toward the maintenance of the roads. They may be prohibited from running on certain highways. The bill is not to become a law at once, but a reasonable time will be given the people to

Recent Happenings Among the Motor Clubs

THE Hoosier Motor Club of Indianapolis is making its plans for the season. The road marking campaign started last year, is to be continued with vigor and roads will be marked into Ohio. Two teams of the club will play a game of baseball in the near future. On May 3 the club will give its annual motor ride for the children of the Indianapolis Orphans' Home. The club, now located on the ninth floor of the Claypool hotel, has arranged to move to the second floor where it will have much larger quarters, including an office, private dining room and lounging rooms.

After a membership campaign waged by the Lorain Automobile Club of Lorain, O., it is found that the rolls now contain the names of more than 125 motor car owners and drivers. The club is planning several race meetings and club runs for the summer season.

The Oil City Automobile Club of Oil City, Pa., recently organized, has elected the following officers: President, Dr. C. W. Coulter; first vice-president, S. H. Simpson; second vice-president, S. Y. Ramage; secretary-treasurer, C. E. Loane, Jr.; board of governors, A. R. Smart, A. L. Confor, H. G. Rush, D. E. Byles, F. E. Brundage, W. O. Platt, B. F., Brundred, W. W. Splane; F. H. Lammers. The motor club already has 200 members.

At a meeting of the governors of the Mandan Automobile Club of Mandan, N. D., it was decided to begin grading roads at once. Three sociability runs will be staged. The first will be a day tour in June to Center, Stanley, Pinto, Hanover, Otter Creek, New Salem and return.

To get all the motor clubs of the northwest together with the aim of establishing an insurance department, is a suggestion

which has recently been made to the Portland Automobile Club. The insurance department of the Automobile Club of Southern California has been established only a few months, but during that time it has issued policies on more than 1,200 owners, many members of the club having cancelled their policies in older insurance organizations to take out insurance with the club.

At a recent meeting of the Automobile Club of Cincinnati Dr. C. W. Bonifield was re-elected president; D. McKim Cooke, first-vice-president; G. W. Greiss, second vice-president; L. J. Merkel, treasurer; L. J. Colter, secretary, and E. J. Carpenter, consulting engineer. Dr. Bonifield has been president of the club for over 10 years. The Queen City Club will give a picnic to the orphans in May.

The Somerset Automobile Club was organized at Skowhegan, Me., last week, when the following officers were elected: Walter P. Ordway, president; John E. Taylor, secretary; Leslie Goldsmith, treasurer; M. P. Merrill, attorney; Lewis Whitney, Norridge-wick, Forrest Colby and John Lander, Bingham; Bernard Gibbs, Madison; Charles Varney, Mercer; Harvey L. Sawyer, Smithfield; S. F. Greene, Solon; Fred Clark, Caratunk; N. W. Bartley, Jackman; H. P. McKinney, Parlin Pond; O. W. Clark, New Portland; George Ayer, Athens; Sam Haines, Pittsfield; Leslie Goldsmith, J. W. Spaulding, Dr. L. A. Dascombe, L. W. Gerrish, and W. E. Hackett, Skowhegan, directors.

Officers for the ensuing year for the Albemarle Automobile of Albemarle, Va., have been elected as follows: R. W. Holsinger, president; Dr. Hugh T. Nelson, Jr., vice-president; George Gilmer, secretary; A. N. Adams, treasurer; Board of Governors, Prof. W. M. Lile, Boardman F. Smith, J. H. Montague, E. E. Egan and H. A. Dinwiddie.

pass judgment on it. If sentiment is too strong against it the measure will be dropped. Many farmers are still opposed to motor cars and considerable education is necessary.

Virginians in Social Run—Early this month L. M. Foster, of the Foster Motor Car Co., will personally conduct a motor sight-seeing tour from Richmond to Natural Bridge, Va., and return, a distance of 457.6 miles. The trip will be of 4 days and 3 nights duration.

Cars Shooed from Curbs—Motor cars are no longer allowed to stand at either curbing on Michigan avenue, between Randolph and Twelfth streets, Chicago, but are required to occupy space in the middle of the driveway, thus establishing greater parking facilities as well as giving an unobstructed view of the boulevard to pedestrians.

Form Non-Speed Club—The Inland Empire Association of Automobile Owners, 250 of them of Spokane, are to handle speed maniacs themselves. Each will have a badge attached to the radiator of his car and the return of this emblem will be demanded for non-payment of dues, reckless or immoderate driving and two convictions in court for mishandling a member's car.

Fights Motor Truck Ban—Believing that the best interests of motor car owners, many of whom operate motor trucks and delivery wagons, are suffering through the refusal of the Ocean Steamship Co. to allow motor-driven vehicles to enter upon the terminals at Savannah, John J. McDounough, Jr., has invoked the aid of the chamber of commerce. It is the desire of McDounough to have the ban on motor-driven vehicles removed in order that owners may be enabled to compete with draymen generally in handling to and from the wharves the ordinary volume of commercial business offering.

Curbs Fire Cart Drivers—Charles E. Coats, fire chief, and the board of safety of Indianapolis have found it necessary to issue orders regulating the speed of motor ap-

ANOTHER good roads club has been formed in Oregon—the Eastern Multnomah Good Roads Club at Columbia, Ore. Grant Bell was elected president, R. P. Rassmussen was elected secretary, and F. Benfield chosen treasurer. This club was formed especially for the bettering of highway along both sides of the Sandy river.

Thirteen of the sixty-two counties have thus far accepted the conditions for securing their share of the new state highway commission's first apportionment of \$318,000 to aid in improving roads in all parts of Colorado, and work upon many important stretches of road will be started at once. The commission is urging the other counties to accept the respective propositions made them and make as extensive improvements as possible before the opening of the tourist season.

A sociability run, to be followed by a good roads rally at Grand Junction, Colo., is being planned by the Colorado-Utah Midland Trail Association for about the first of June. Many cars from Denver, Idaho Springs and Glenwood Springs, Colo., Salt Lake City, Provo, Price and Green River, Utah, and others points along this link of the trail have been promised, and the promoters of the enterprise also are hoping to secure delegates from Nevada, California, Nebraska and Kansas.

Mayor William Short and Alderman Gustave H. May, who will represent the city of Edmonton, Alta., at the convention of the Union of Canadian Municipalities in Saskatoon, Sask., July 15 to 17, will present resolution to that body favoring the construction of an interprovincial highway through Jasper park and thence through the most

paratus. In the future violation of the schedule will be deemed sufficient ground for the dismissal of a fire department chauffeur. Motor apparatus going to a fire is to go not faster than 35 miles an hour and the speed

feasible pass to the Pacific coast. They have been instructed to work for the Saskatchewan river route in the prairie provinces.

With the adjournment of the Ohio general assembly it is seen that considerable good roads legislation was brought about. In all four laws were passed, bearing on the subject of good roads. One of the laws provides for a tax of a half-mill on the state duplicate for road improvement, which will bring in approximately \$3,500,000 yearly; another for the use of split-log drags on the roads, a third for the improvement of the old National highway; and the fourth for the codification of all of the road laws of the state.

The Ohio state highway commission has notified the commissioners of each of the counties of the state in the flooded district that an amount of approximately \$12,000 would be immediately available for the repair of roads and bridges, occasioned by the recent flood. It is the usual plan for the state highway department to give counties aid in building new roads, but this year the money will be used exclusively in repair work.

Attorney-General Hogan has held that the Quinlisk amendment to the Warnes motor law, recently enacted by the Ohio general assembly which provides for an equal distribution of the surplus money, derived from the registration of cars in Ohio, among the various counties of the state for road improvement, is constitutional. It is held by the attorney-general that as roads may be considered both of a local and state-wide nature, the principle that taxes are to be spent where raised, may be disregarded.

returning to the engine house is to be limited to 20 miles an hour. Motor fire apparatus has been in a number of serious accidents recently due to fast and reckless driving.

Governors Who Motor—Hiram W. Johnson of the State of California

GOVERNOR JOHNSON OF CALIFORNIA, STANDING AND HOLDING STRAW HAT



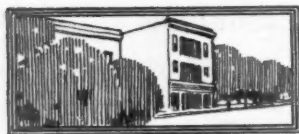
GOVERNOR HIRAM W. JOHNSON, of California, is not only an enthusiastic motorist himself, but the members of his family also are motorists. Governor Johnson, while a resident of San Francisco, drove his own machine, but as governor, he has provided for him by the state a car to drive to and from the state house from the executive mansion. The governor's sons in San Francisco drive the family machine, while the chief executive of the state is using another family car at Sacramento.

The California legislature 2 years ago decided that a motor car is an essential part of the state machinery. An appropriation of \$3,500 was made to purchase a car for the governor. Johnson, realizing that the appropriation was for himself, did not affix his signature to the bill making the appropriation, but allowed it to become a law without executive approval.

For the use of the Governor and Mrs. Johnson, an electric brougham was purchased, and the governor may be seen almost any day in that car. He has in addition a touring car for use on the magnificent roads about Sacramento, the state capital.

During his campaign of 2 years ago Governor Johnson toured the state in his Locomobile, his son, Hiram W. Johnson, Jr., piloting it during the major part of the time.

California's \$18,000,000 highway fund is being expended under the general direction of Governor Johnson, with results that all the world knows.



Among the Makers and Dealers



FEDDERS Company Incorporated—The Fedders Mfg. Co., with a capitalization of \$400,000, has been incorporated at Buffalo to sell radiators and sheet metal specialties.

New Racine Concern—The Racine Drop Forge Co. has been organized at Racine, Wis., and leased extensive floor space in the former Racine-Sattley works, part of which is occupied by the Lavigne Gear Co., and other parts and accessory manufacturers. The company will do die, sinking, heat treating, punching, welding, cutting and hand-forging in addition to the principal output, drop forgings.

Goodrich Building in Canada—The B. F. Goodrich Co. is definitely committed to a new Canadian factory which will be commenced as soon as the weather permits. Thirty-two acres of land have been secured at St. Catharines, Ont., conveniently located for the handling of traffic by railroad and the new factory will be modeled on the lines of the parent Akron plant. When fully developed it is planned to employ 1,000 hands with ample provision for future extensions.

Legal Fight Over Agency—The Imperial Motor Co., of Washington, D. C., has filed suit against the Motz Tire and Rubber Co., and F. C. Fickling, its branch manager in Washington, D. C., to enjoin them from attempting to establish a branch store in that city for the sale of Motz tires throughout the District of Columbia. The plaintiff claims it has the exclusive right to sell Motz tires there under a contract made in December, 1911. An injunction and accounting is asked by the plaintiff.

Closed Bodies for Franklin Little Six—A full line of closed bodies on the little six chassis will appear next fall, is the announcement of the Franklin Automobile Co. There will be a limousine seating four inside; a berline seating four inside; a sedan seating five people; and a coupe seating three. Coincident with the announcement that the little six will appear in several different body types comes the one that the Franklin four cylinder model G runabouts have all been sold and no more cars of this type will be built.

New Insurance Company Formed—At a meeting of the incorporators of the Automobile Insurance Co. of Hartford, Conn., it was voted that the first capital stock of the company be fixed at 3,000 shares, par value \$100 per share, with stock to be offered for subscription at \$200 a share, \$100 to be capital and \$100 surplus. The entire amount of capital stock was subscribed for and paid in cash. This new company will write motor car insurance and will begin business at once. The following officers were elected: Morgan G.

Bulkeley, president; Morgan B. Brainard, vice-president; J. Scofield Rowe, secretary; Charles H. Remington, treasurer; Herbert R. Clough and J. C. Barden, assistant secretaries.

Yakima Valley Prospects—On account of the very low price for apples during the past year in the Yakima valley, in that section of the state of Washington the demand for motor cars is very poor. It is expected, however, that these conditions will not prevail during the coming season.

Cole Making Big Plans—The future production figures for the Cole will double, a \$150,000 addition to the present plant on East Washington street, Indianapolis, will be built, and the organization generally enlarged as the result of plans promulgated by President J. J. Cole of the Cole Motor Car Co., following his tour through the southwest, the Pacific coast and the Canadian northwest.

Improving Truck Plant—The Four-Wheel Drive Automobile Co. has awarded all contracts for factory No. 3, the newest and largest addition to its plant at Clintonville, Wis., which is to be ready for operations July 1. Upon its completion, work will be started on factory No. 4, which is to be 100 by 120 feet in size, similar to the No. 3 building now under way. A power house, 40 by 40 feet in size also will be erected without delay. The improvements will cost in excess of \$75,000.

To Make Canadian Tire Duck—An indication of the strides made by the motor industry in Canada is given by the announcement that the new Canadian Connecticut Cotton Mills, recently organized by Canadian and American interests, will devote its entire plant at Sherbrooke, P. Q., to the manufacture of tire duck, the grade of cotton which is extensively used in the lining of motor car tires. Up to the present Canadian companies have had to import supplies of tire duck from the United States against a duty of 20 per cent.

Quakers Tackle Used Car Problem—The Philadelphia Automobile Trade Association has under consideration comprehensive plans for the establishment of a huge co-operative station of sufficient proportions to handle practically all makes of used cars and also to accommodate the annual shows conducted by the association. The project as proposed by an active member of the association, E. C. Johnson, comprehends the purchase of a plot of ground and erection thereon of a building sufficiently large to house the cars taken in trade by members of the association, who comprise a majority of the dealers and branch managers in Philadelphia. A fixed schedule of prices for these cars will

be determined and each will be under the jurisdiction of the association. A committee has been appointed to take the proposition under advisement and make recommendations.

Hydraulic Transmission Co. Formed—The Hydraulic Transmission Co., of Stevens Point, Wis., has been organized by Arthur and Benjamin Beijer and J. P. Atwell, and incorporated under the laws of Wisconsin with a capital stock of \$45,000.

New Coast Industry—Announcement is made by Volney S. Beardsley, president and manager of the California Automobile Co., that all plans had been completed to manufacture electric cars on the coast with a factory located at Los Angeles. John T. Shannon is the electrical engineer for the new company.

Ford Plant for Dallas—The Ford Motor Co., is to build a large assembling plant at Dallas, Texas, in the near future. Such strides having been made in Dallas and Texas it is said the officials of the company have decided that a plant, second only to the one at Detroit should be located in the south.

Radiator Company Reorganizes—The Prefex Radiator Co., which moved its works and offices from Chicago to Racine, Wis., several months ago, has re-organized as a Wisconsin corporation under the same style, with a capital stock of \$15,000. The principal shareholders are A. B. Modine, J. D. Rowland and F. M. Opitz. The company is continually enlarging its facilities to meet the demand for its product, consisting mainly of radiators for pleasure and commercial cars.

Kissel Tells of Coast Deal—George A. Kissel, president of the Kissel Motor Car Co., Hartford, Wis., has just returned from an extended trip to the Pacific coast and return in a new model Kisselkar, to the manufacture of which the new Milwaukee works of the Kissel company will be devoted exclusively. The company is not ready to announce the details or specifications of the new model, and will not do so until the production has reached the stage when deliveries to branches and agencies are made certain. "The important business result of my trip was the completion of the new organization which will market our product west of the Rocky mountains," said Mr. Kissel upon his return. "The plans of the new coast branch contemplate the erection of new service buildings in all of the principal cities and the engagement of several hundred additional salesmen and mechanics. It will operate not only on the coast and mountain states, but extend across the seas to Honolulu and north through British Columbia.

The merger concerns the Milwaukee plant rather than our main works at Hartford, for the entire production of the new branch factory at Milwaukee has been contracted for by the western connection."

Broadwell Again Fisk Man—E. H. Broadwell has gone back to his old position as vice-president of the Fisk Rubber Co., which he resigned to go with the Hudson company at Detroit. He will make his headquarters at Chicopee Falls, Mass.

Tool Company Changes Hands—The Milwaukee Machine Tool Co., a large manufacturer of lathes and tools used by American motor car builders, has passed into the control of E. J. Kearney and Theodore Trecker, owners of the Kearney & Trecker Co., manufacturer of Milwaukee milling machines. The two plants are situated at West Allis and are two blocks apart. They will, however, be continued as separate institutions.

Connecticut Statistics—According to latest reports 3,815 men are employed in the manufacture of cars and parts in the state of Connecticut with an annual value of \$11,668,000. The motor industry represents a shade more than one-half of the silk industry, one-sixth of that of foundry and machine shop products and a little more than one-half of the valuation of arms and ammunition manufactured in the Nutmeg state.

Studebaker Devise Profit-Sharing Plan—The Studebaker Corp. has sent out an announcement of profit-sharing by which certain of its employes are offered the opportunity of becoming stockholders in the corporation. The directors have approved in principle of the establishment of a profit-sharing plan which provides that after dividends have been paid or deducted on the preferred stock and 5 per cent on the common stock, a part of the remaining net profits shall be set apart in a profit-sharing fund for the purchase at market price of common stock of the corporation to be held in trust for 3 years and then distributed among participating employes. The participants embrace employes holding executive positions at South Bend and Detroit, such as managers of departments, assistant managers of departments, superintendents of departments and foremen of departments, but excludes all directors of the corporation and any officer or employee who holds a personal bonus contract. The fund is credited to the individual participants in the ratio that their salaries bear to the total salaries of all participants. The fund is to be set apart from the assets of the corporation and is to be administered by a board of managers composed of the first vice-president, the treasurer, the general manager, the assistant general manager at Detroit and the works manager at South Bend, and an officer of the trust company that is selected as custodian of the fund. The details of the plan explain rules affecting employes who might die, retire on account of age or leave the service of the corporation. An equitable system has

been devised whereby the rights of all are conserved. The directors believe that the plan will more closely identify employes with the successful outcome of the business of the corporation.

May Make Tires—As the result of a strike of thirty employes of the strapping and cementing department of the Chicago Rubber Clothing Co., at Racine, Wis., it is probable that the concern will discontinue the manufacture of rubber clothing and turn the big plant into a motor car tire manufactory.

To Make Motors—Paul Klumb of Sheboygan, Wis., secretary of the Globe Foundry and Machine Co., of Sheboygan, has organized a new company with his two sons, Ewald and Oscar to engage in the manufacture of gasoline motors. A plant will be erected at once. The main building will be 150 by 80 feet in size.

E. S. Kelly Retiring—E. S. Kelly has resigned the presidency of the Kelly-Springfield Motor Truck Co., because of ill health. Acceptance of his resignation was agreed to, only upon his consent to continue with the company as chairman of its board of directors. Mr. Kelly has gone to a sanatorium at Dansville, N. Y., where he will remain for some time in the hope of recuperating to a degree which will enable him to spend some time in Europe during

the present summer. J. L. Geddes, formerly general manager of the Detroit City Gas Co., was nominated by Mr. Kelly to succeed to the presidency of the Kelly-Springfield company.

Hernandez Knighted—Ray M. Hernandez, who has been connected with the United States Tire Co., since its organization, as special representative in the Chicago territory, has resigned to become eastern district manager for the Knight Tire and Rubber Co. Mr. Hernandez will make his headquarters at 1671 Broadway, New York.

New Officers for U. S. L. & H. Co.—The board of directors of the United States Light and Heating Co. has elected the following officers: Chairman of board of directors, Charles A. Starbuck; president, J. Allen Smith; vice-presidents, Frank P. Frazier and William P. Hawley; general manager, A. H. Ackermann; secretary, W. S. Crandell.

To Pass Goodrich Dividend—The announcement is made by the officials of the B. F. Goodrich Co. that the board of directors at the regular quarterly session to be held soon will pass the dividend on the common stock. This course was forecasted at the annual meeting of the company. It is not stated the length of time the common dividend will be suspended.

Recent Incorporations

Bellaire, O.—Bellaire Automobile Co., capital stock, \$6,500; to manufacture and deal in motor cars; incorporators, G. D. Spragg, J. F. Johnson, G. Heili, J. R. Greenlee, W. H. Morris.

Brooklyn, N. Y.—Haslup-Bras Mfg. Co., capital stock, \$25,000; to deal in motor car supplies; incorporators, E. W. Haslup, F. H. Glober, J. Scholl.

Brooklyn, N. Y.—Whittemore Cab Co., capital stock, \$1,000; to operate livery; incorporators, W. I. Wiedman, A. Wald, C. F. Fuerst.

Buffalo, N. Y.—Fedders Mfg. Co., capital stock, \$400,000; to manufacture and deal in radiators; incorporators, T. C. Fedders, C. W. Fedders, J. M. Fedders, L. F. Fedders.

Buffalo, N. Y.—Selleck Co., capital stock, \$40,000; to deal in motor cars; incorporators, W. V. Selleck, G. K. Selleck, M. L. Selleck.

Calgary, Can.—Motor Traction Co., capital stock, \$250,000.

Cincinnati, O.—National Auto and Livery Co., capital stock, \$2,000; incorporators, W. H. Peters, H. W. Warren.

Cincinnati, O.—Cincinnati Alco Motor Car and Truck Co., capital stock, \$25,000; incorporators, W. H. Peters, H. W. Warren.

Cincinnati, O.—National Auto School Co., capital stock, \$50,000; incorporators, G. A. Hawley, H. C. Williamson, W. A. Evans, C. H. McComas, J. D. McCracken.

Cleveland, O.—Pressed Steel Motor Car Co., capital stock, \$200,000; incorporators, Fred D. Merwin and others.

Cleveland, O.—Hercules Lock Co., capital stock, \$1,000; to manufacture motor cars specialties; incorporators, H. A. Hauxhurst, G. Blaisell, R. T. Mitchell, R. Hall, H. T. Flannagan.

Clayton, N. Y.—Clayton Motor Repair and Supply Corp., capital stock, \$15,000; incorporators, W. M. McCawley, L. A. Phillips, A. C. Bakewell, Jr.

Columbus, O.—Krit Motor Sales Co., capital stock, \$10,000; incorporators, H. S. Smith, C. A. Smith, H. A. Sell, C. B. Temple, D. Haken.

Dover, Del.—Wahl Motor Co., capital stock, \$500,000; incorporator, J. E. Hofweber.

Hartford, Conn.—Hartford Storage Battery and Supply Co., capital stock, \$10,000; incorporators, G. W. Gammack, C. C. Krolin, E. D. Gammack.

Hartford, Conn.—Automobile Insurance Co., capital stock, \$600,000; president, M. G. Bukley.

Hartford, Conn.—New England Car Co., capital stock, \$5,000; incorporators, H. T. Sheldon, A. D. Osborne, T. M. Steele.

Joplin, Mo.—Arnold Motor and Supply Co., capital stock, \$2,000; incorporators, J. L. Arnold, I. T. Arnold.

Kingston, Can.—Northern Motor Car Co., capital stock, \$250,000.

Meriden, Conn.—Cuno Engineering Corp., capital stock, \$50,000; to design and manufacture motor cars; incorporators, C. Cuno, C. H. Cuno, A. Cuno.

New York—Eagle Sales Corp., capital stock, \$5,000; to deal in motor cars and supplies; incorporators, L. Weinberg, D. Goldman, I. Goldman.

New York—Merralls' Air and Steam Engine Co., capital stock, \$150,000; to manufacture air starters; incorporators, W. Brady, J. C. Heberer, W. A. Merralls.

New York—Gaulois Tire Corp., capital stock, \$20,000; incorporators, J. Grenier, V. W. Cutting, M. Leon.

New York—Hampton Kerosene Carburetor Co., capital stock, \$150,000; incorporators, W. Hampton Defontaine, C. A. Burr, O. H. Cacola.

New York—Motor Service Corp., capital stock, \$500; incorporators, W. G. Smith, F. H. Merrill, M. Dittenhoefer.

New York—Normal Automobile Station, capital stock, \$10,000; incorporators, J. F. Bokelman, A. Bokelman, E. Ganter.

New York—Mohawk Rubber Co., capital stock, \$10,000; to manufacture and deal in tires; incorporators, J. Dammann, L. Dammann, M. Dammann.

New York—Ireland Rubber Co., capital stock, \$25,000; to manufacture and deal in rubber goods; incorporators, F. W. Humphreys, C. Suman, W. Ulrich.

New York—Greater New York Motor Co., capital stock, \$10,000; to conduct a garage; incorporators, A. Merusi, S. Feldman, C. Pianisani.

Philadelphia, Pa.—Henschel Tire and Rubber Co., capital stock, \$10,000; to manufacture and deal in tires; incorporators, R. Henschel, A. Henschel, W. A. Wollman.

Richmond, Va.—H. G. Wagner Auto Co., capital stock, \$25,000; incorporators, H. G. Wagner, F. W. Morehead, F. Phillips.

Sacred Heart, Minn.—Sacred Heart Automobile Co., capital stock, \$10,000; incorporators, J. H. Sagnes, P. O. Melneass, T. Arestad, W. A. Day, E. P. Dosseth.

Schenectady, N. Y.—Auto Mercury Publishing Co., capital stock, \$100,000; incorporators, J. P. Fallon, T. P. Comeford.

Slayton, Minn.—Murray County Automobile Co., capital stock, \$10,000; incorporators, A. Peick, F. F. Young, O. L. Young, O. H. Herrington, Leroy Tripplet, W. E. Richardson, O. Duchene, C. Casey, Charles Carlson.

Troy, N. Y.—Grand Street Garage, capital stock, \$3,000; incorporators S. W. Smith, W. G. Swartout, M. J. Cohen.

Wilmington, Del.—Connecticut Transit Co., capital stock, \$300,000; to manufacture motor cars; incorporators, W. H. Heald and others.



CAT
DOG
MOTOR
PLUG

The Motorist's Kindergarten

EDITOR'S NOTE—Motor Age is publishing in this department a series of non-technical explanations of the various parts of motor cars for the benefit of the reader who knows nothing about them. The subjects will be dealt with in the most elementary manner, so that the series when completed will form a simple elucidation of the car. The first article appeared October 10, 1912.

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There is another type, known as the two-port, which more nearly resembles the four-cycle engine. Although this latter type operates upon the two-cycle principle, it has an intake valve very much like that used on four-cycle engines. The transfer of the gas from the crankcase to the cylinder and the exhaust valve are similar to those of the three-port type of two-cylinder engine. As shown in Fig. 60, the mixture of gas and air from the carburetor is taken into the crankcase through an automatic or atmospheric inlet valve at the juncture of the inlet manifold and the crank chamber.

Valves Are Automatic

This valve is called an automatic valve because it does not depend upon cams or rods to open it. It is opened by the suction in the crankcase as the piston moves upward. Its operation depends upon the difference in pressure in the crankcase and the atmosphere, which accounts for the fact that such valves often are called atmospheric valves.

At the left of Fig. 60 is shown the con-

The Two-Cycle Gas Engine Two-Port Type—Part II

dition of the cylinder just before a spark takes place. The piston is nearing the end of its upward stroke and is compressing the gas in the cylinder above it. At the same time the suction it creates in the crankcase causes the inlet automatic valve to open, admitting gas from the carburetor.

Two-Cycle Power Stroke

The middle illustration shows the condition when the piston is near the end of its power stroke. The piston has about half-way uncovered the exhaust port, allowing the flaming gas to escape from the cylinder. The downward movement of the piston causes the fresh gas in the crankcase to be under some compression, which holds the automatic inlet valve tightly against its seat and at the same time forces some of the fresh gas through the transfer port to the secondary inlet port. The latter at this time is closed by the piston, but as soon as the piston travels a little further downward this second inlet port is opened by the head of the piston getting below the opening of the transfer port or bypass and the fresh gas is pushed right around the piston from the crankcase to the cylinder.

At the same time, the last of the exhaust gas is being forced out of the cylinder on the other side by its own pres-

sure and that of the incoming fresh gas. The latter is sent upward toward the top of the cylinder by the deflector, so that it will not become mixed with the burned gas or sent out with it. By the time the piston passes bottom dead center and starts upward again, all of the burned gas is supposed to have been exhausted and replaced by a full charge of the fresh mixture. One of the faults of the two-cycle engine is that often the burned gas is not exhausted completely before the piston covers the exhaust port on its upward stroke. The remaining exhaust gas mixes with the fresh gas and dilutes it, cutting down the explosive force of the gas and thus decreasing the power exerted by the motor.

As the piston begins its upward stroke from the position shown at the right, the suction in the crankcase caused the automatic inlet valve to open, drawing fresh gas into the crankcase from the carburetor. At the same time, the fresh gas above the piston is being compressed between the top of the cylinder and the head of the piston, so that as the piston nears the top of its stroke, affairs are in the same condition as that indicated at the left. The spark occurs, and the process is continued indefinitely. The upward stroke gives intake and compression, and the downward stroke gives power, exhaust and transfer.

Difficulties of Engine Operation

One of the difficulties in two-cycle operation is the fact that with the crankcase compression the crank chamber had to be air-tight because a leak of gas would make the motor inefficient and leaks of air into the crankcase would weaken the mixture. It is found difficult to prevent leaks at the crankshaft bearings and around the joints. In one two-cycle motor which was the feature of a car manufactured until recently, this difficulty was overcome by compressing the gas in an annular space around the piston, instead of in the crankcase.

The lower part of the cylinder was made larger in diameter than the upper part and the bottom edge of the piston was made to fit this enlarged part of the cylinder. The space thus formed between the enlarged cylinder wall and the narrow part of the piston formed the compression chamber. Fresh gas was drawn into this annular chamber from the carburetor on the down stroke of the piston and compressed on the up-stroke of the piston. A rotary valve or distributor driven by gears from the crankshaft was employed to transfer gas.

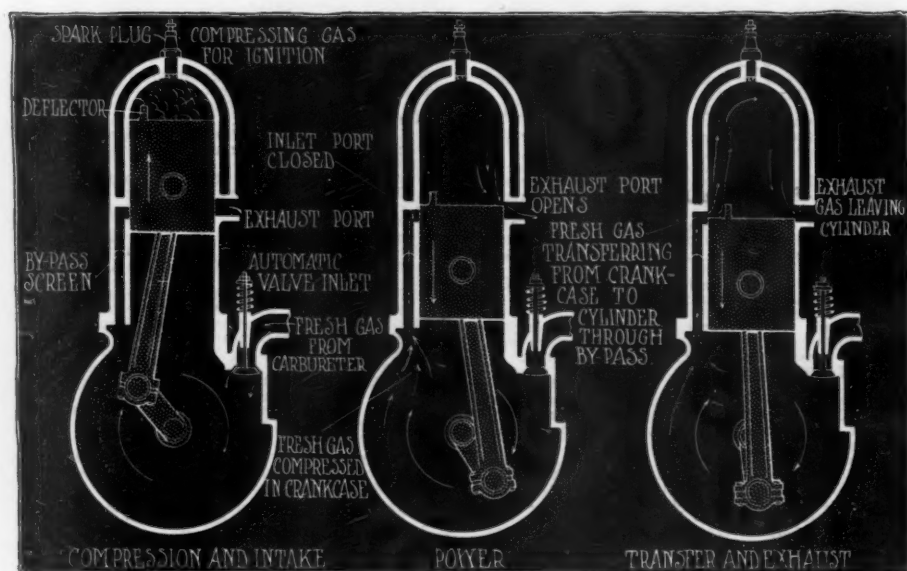


FIG. 60—OPERATION OF TWO-PORT, TWO-CYCLE ENGINE

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The Accessory Corner

Fa-Vose Plate Radiator

WE are all familiar with the two well-known types of radiator design, namely, tubular and cellular. However, another method of construction has been devised by the Farlinger Mfg Co., Detroit, Mich., a comparatively new concern in this field.

Fig. 1 gives an idea of the new design, which has for one of its principal claims of superiority that of small number of parts. The total number is given as twenty-seven. In the Fa-Vose construction each plate is made from two sheets of 28 or 30 gauge brass. The blank sheets are stamped with ferrules integral with them. That is, the metal stamped out to make the holes is formed into the ferrules. Those of one side are made slightly larger in diameter than those of the other. Thus, when the sheets are placed together, the mating projections of one sheet fit perfectly over those of the other, and are then telescoped and securely locked together. Instead of separate metal tubes joined to and passing between the plates, these tubes therefore are integrally a part of the original sheets. The open edges of the plates then are closed, by means of strips of drawn metal, after which the whole plate assembly is given a solder bath to make all joints water tight. It is said that the process renders the joints proof against the escape of steam.

It is claimed that with the Fa-Vose construction about 45 per cent more radiation surface is given than with the cellular type. In 1 square foot of plate there are 370½ square inches of exposed cooling surface.

Referring to Fig. 1, which is a three-plate construction, it will be seen that the air circulates between each plate in the space B, and passes through the tubes A, back through space C, which is provided so that additional plates may be added if greater radiation surface is required. Or,

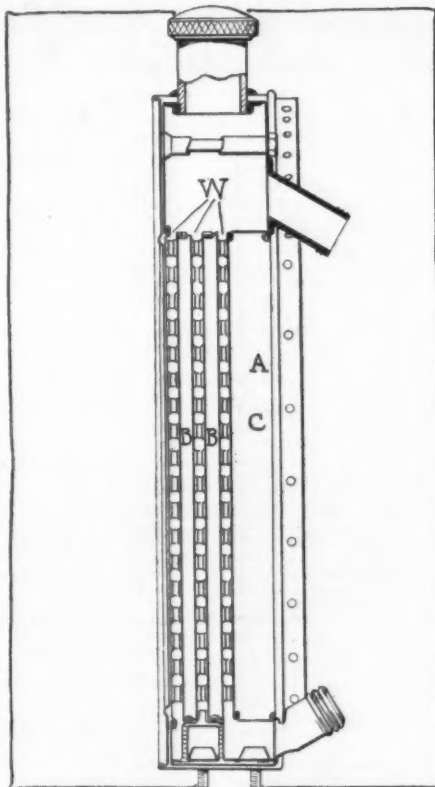


FIG. 1—FA-VOSE PLATE RADIATOR

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Durno Engine Starter

A combination mechanical and spring starter that can be fitted to any make of motor car is being offered by the Durno Mfg. Co., Rochester, N. Y. In Fig. 2 is shown the components of the system. An air tank is provided with air at 500 pounds pressure from a pump which is motor driven. The tank is filled and exhausted at the will of the operator. M in the figure is the drum housing, in which there is a drum of 4 inches diameter.

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It will be noticed that the pedal operates a wheel. This controls a three-way valve so that three different pressures may be obtained. With the air in the cylinder, the piston therein is forced outward, thereby pushing the piston back. This pulls the piston rod and unwinds the chain.

In order to start the motor the foot lever L must be pressed continually, for as soon as the pressure is released the chain is rewound, ready for the next motor start. The valve V is called the night valve and is manually controlled. This shuts off the air from the air tank when the car is housed for the night. A gauge G gives indications of the pressure in the air tank.

A special tire inflating device is part of the system. A lead from the cylinder is run to the tire and air forced from the cylinder. The gauge T tells the pressure in the air hose. The chain holding unit is fastened by the brackets FB.

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Rear end collisions are perhaps as numerous as front end smashes, due to the fact that the driver may see ahead but not behind. Often in traffic and crowded thoroughfares, the driver of a car cannot stretch out his hand quickly enough to warn the driver of the car behind him. The result is that the car in the rear hits the forward car. The Emil Grossman Co., New York, in offering the E. G. rear bumper accentuates the necessity of protecting the rear of the vehicle as well as the front.

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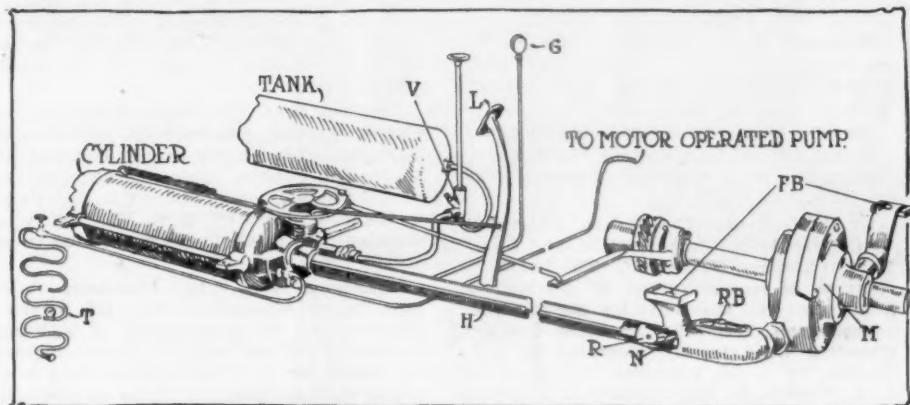


FIG. 2—ARRANGEMENT OF PARTS OF Durno Engine Starter SHOWING TANK FOR HOLDING AIR AND TIRE INFLATING UNIT

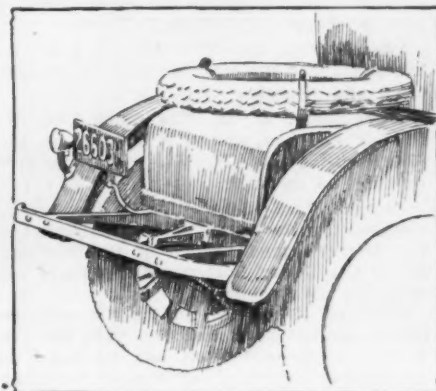
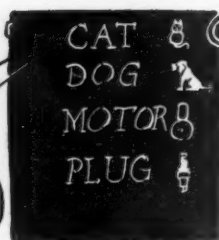


FIG. 3—E. G. BUMPER AS USED ON REAR OF A COUPE



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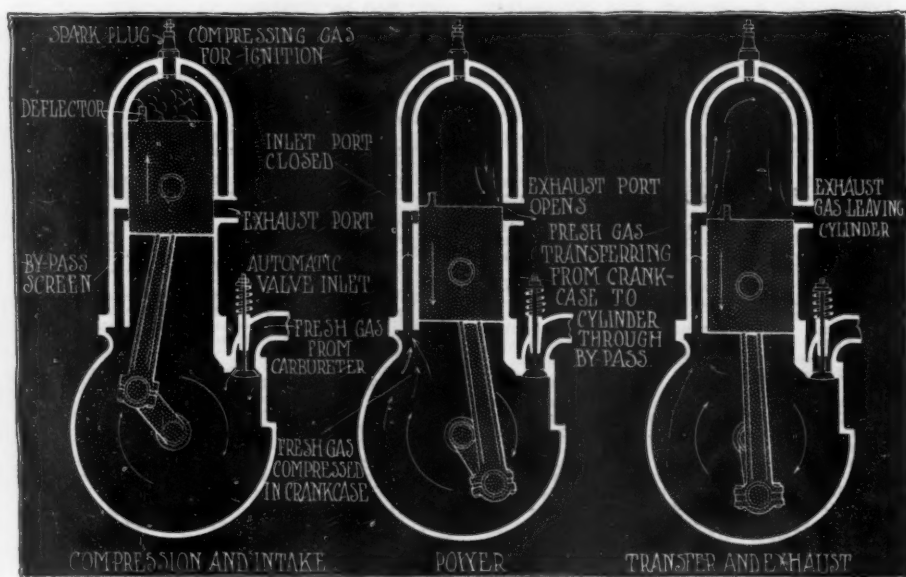


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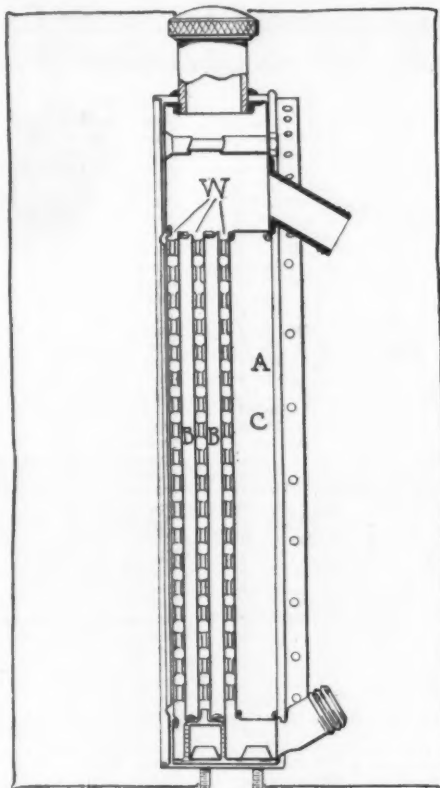


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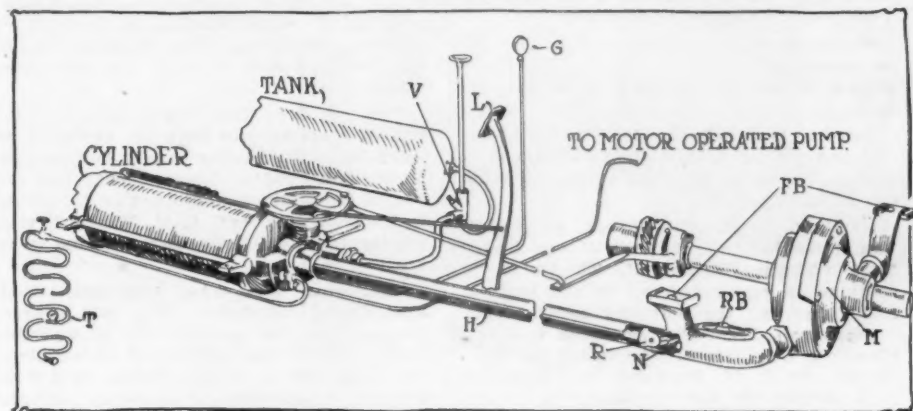


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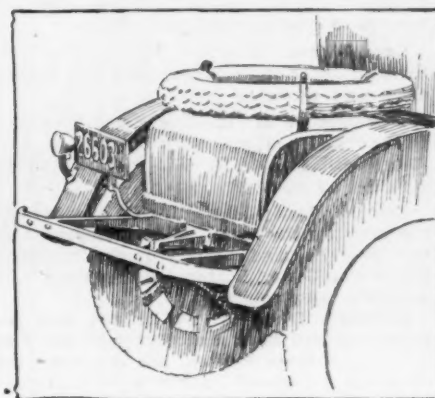
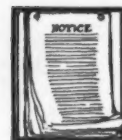


FIG. 3—E. G. BUMPER AS USED ON REAR OF A COUPE



Brief Business Announcements



Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Alameda, Cal.	James H. Burton	Regal	Los Angeles, Cal.	C. H. Phillips	Oakland
Amarillo, Tex.	F. W. Hays	Oakland	Los Angeles, Cal.	Y. R. del Valle	Touraine
Antioch, Cal.	Christiansen Brothers	Regal	Madison, Neb.	W. H. Blakeman	Abbott-Detroit
Arbuckle, Cal.	Sanders Brothers	Regal	Modesto, Cal.	Modesto Garage	Regal
Bagdad, Fla.	Linderink & Merwin	Moon	Moneta, Ia.	H. D. Rixen	Moon
Baltimore, Md.	Miller Auto Co.	American	Napa, Cal.	Hause-Busch Auto Co.	Regal
Baltimore, Md.	William J. Meyers & Co.	Jackson	Newark, Cal.	J. P. Stinehoff	Regal
Baltimore, Md.	Shaffer Mfg. Co.	Pullman	Newark, N. J.	G. G. Baker	Moon
Baltimore, Md.	Cook and Fletcher	Stanley	New Rochelle, N. Y.	Paris Auto Co.	Oakland
Benicia, Cal.	Benicia Garage	Regal	Omaha, Neb.	Haynes Auto Sales Co.	Oakland
Blanchard, Ia.	A. J. Joy	Hupmobile	Orosi, Cal.	G. W. Knox	Regal
Boston, Mass.	Springfield Buick Co.	Buick	Ottawa, Canada	H. L. Wood	Moon
Bradford, Pa.	Fred W. Putnam	Pilot	Palo Alto, Cal.	Vandervoort Brothers	Regal
Bradshaw, Neb.	Oakland Motor Car Co.	Oakland	Paris, Tex.	Ray Auto Co.	Oakland
Brattleboro, Vt.	John J. O'Hare	Pilot	Pasadena, Cal.	Kendall Auto Co.	Oakland
Calistoga, Cal.	Calistoga Garage	Regal	Petaluma, Cal.	Thomas & Bauer	Regal
Carmi, Ill.	Joplin Supply Co.	Moon	Petersburg, Va.	J. Rogerson	Pilot
Chicago	Lincoln Park Auto Exchange	R. C. H.	Philadelphia, Pa.	Raymond McCormick	Pilot
Chico, Cal.	Phillip Pennick	Regal	Philadelphia, Pa.	McConaha Co.	Pilot
Claysville, Pa.	Raymond McCormick	Pilot	Phoenix, Ariz.	Thomas H. Higley	Oakland
Concord, N. H.	B. A. Wythers	Oakland	Redlands, Cal.	A. J. Happe	Oakland
Cos Cob, Conn.	Fred W. Tidy	Moon	Reedley, Cal.	J. M. Evans	Regal
Detroit, Mich.	J. P. Lechrone	Metz	Pender, Neb.	C. M. Munson	Moon
Dixon, Cal.	L. J. McDermott	Regal	Pomona, Cal.	Julius M. Ulrich	Moon
East Liverpool, O.	Tri-State Garage	Buick	Portland, Ore.	Usborne-Whitston Sales Co.	Keeton
Edmonton, Alta., Can.	C. M. Jamieson	Franklin	Pukwana, S. D.	G. Colyer & Co.	Moon
Frederickton, N. B., Can.	Smith Foundry Co.	Franklin	Richmond, Ind.	Masontown Motor Car Co.	Pilot
Emerson, Neb.	T. H. Land	Moon	Richmond, Va.	Cutting Co.	Cutting
Fresno, Cal.	M. R. Madary	Regal	Rising Sun, O.	E. F. Day	Franklin
Forestville, Cal.	C. C. Olliver	Regal	Sacramento, Cal.	Sidelinger, Philpot & Co.	Regal
Groton, S. D.	Geister & Sheldon	Hupmobile	San Jose, Cal.	Garden City Auto Co.	Regal
Hartford, Conn.	Lewis M. Camp	Koehler	Santa Cruz, Cal.	Jensen Brothers	Regal
Hartford, Conn.	R. M. Spencer	Krit	Seattle, Wash.	Sleret and Peterson Co.	Regal
Hartford, Conn.	Lewis M. Camp	Metz	Springfield, Mass.	Concord Auto Sales Co.	R. C. H.
Hanford, Cal.	R. G. White	Regal	St. Helena, Cal.	Will Dinning	Regal
Hollister, Cal.	Hollister Auto and Machinery Co.	Regal	St. Louis, Mo.	Clark Motor Co.	Regal
Holyrood, Kan.	W. P. Atkinson	Moon	St. Louis, Mo.	Meyers-Busch Motor Car Co.	Davis
Huntington, W. Va.	D. M. Fell	Moon	Stevensville, Ont., Can.	G. Weiss	Oakland
Irvine, N. J.	Louis Ruwe	Moon	Stevensville, Ont., Can.	G. Weiss	Hupmobile
Joplin, Mo.	F. M. Hawkins	Moon	Stockton, Cal.	Superior Garage	Regal
Junius, S. D.	Innes & McGowan	Hupmobile	Troy, N. Y.	E. D. Noble	Pilot
Kearney, Neb.	Franks & Kouer	Hupmobile	Utica, Neb.	Utica Automobile Co.	Hupmobile
Kearney, Neb.	Franks & Kouer	Great Western	Vallejo, Cal.	P. H. Krantz	Regal
Kearney, Neb.	Franks & Kouer	Empire	Visalia, Cal.	Mrs. J. B. Howard	Regal
Keene, N. H.	A. W. Dickerman	Metz	Washington, D. C.	Oscar A. Reed	Cartercar
Kerman, Cal.	J. Anderson	Regal	Weyawega, Wis.	Weyawega Garage	Oakland
Kingsburg, Cal.	Fred G. Anderson	Regal	Williams, Cal.	G. B. Harlan	Regal
Lewiston, Me.	Androscoquin Motor Co.	Inter-State	Yuba City, Cal.	Rollin Williams	Regal
Lincoln, Neb.	L. E. Tait Auto Co.	Chalmers	York, Pa.	Harris & Sons	Stewart
Livermore, Cal.	D. E. Martin	Regal			

COMMERCIAL CARS

Austin, Tex.	Thomson-Half Co.	Best
Buffalo, N. Y.	Verbeck & Palmer	Koehler
Columbus, O.	Farmers Supply Co.	Best
Green Bay, Wis.	DuBois, Haevors & Co.	Best
Hartford, Conn.	L. M. Camp	Koehler
Houston, Tex.	Hawkins-Half Co.	Best
Lawrence, Mass.	Mills Motor Car Co.	Best
Evans City, Pa.	W. C. Laderer	Best
Dallas, Tex.	Half Co.	Best
McKees Rocks, Pa.	Hamal & Noble	Koehler

Minneapolis, Minn.	Damoth & Goggin	Koehler
Monroe, Wis.	John J. Westcott	Koehler
San Antonio, Tex.	G. A. C. Half	Best
St. Paul, Minn.	Joseph A. Maloney	Koehler
Steubenville, O.	J. H. Timberlake	Koehler
Springfield, Ill.	Hunter Auto Service Co.	Best
Waco, Tex.	Willis-Half Co.	Best
Washington, Pa.	Standard Auto Co.	Koehler
Worcester, Mass.	White Motor Car Co.	Best

Boston, Mass.—C. O. Sacks has accepted a position as advertising manager for Gray & Davis.

Minneapolis, Minn.—C. L. Dobbs has opened the Twin City Magneto Exchange at 1018 Nicollet avenue.

Minneapolis, Minn.—The Kelly-Springfield Motor Truck Co. has established a branch here in charge of William L. Davis.

Des Moines, Ia.—The Prest-O-Lite Co. has announced the establishment of a branch office and charging plant here.

Washington, D. C.—The Motz Tire and Rubber Co. has opened a branch at 1012 Fourteenth street, N. W., with Frank G. Fickling as manager.

Boston, Mass.—John Fischer has become manager of the retail sales department of the New England branch of the Michigan Motor Car Co. of Boston. He formerly was with the Hupmobile.

Hartford, Conn.—R. D. Britton who recently severed his connection with the firm of R. D. & C. O. Britton, has organized the Automobile Buyers' League with headquarters in the Phoenix National Bank building. The new organization will finance passenger

and commercial car buyers who have not the ready cash to procure vehicles.

Buffalo, N. Y.—J. R. Coleman has resigned his position as chief engineer of the Atterbury Motor Car Co.

Omaha, Neb.—A \$75,000 motor car building will be erected here by John Harte, at Twenty-fifth avenue and Farnam.

Plymouth, Mass.—Arthur H. Chandler has purchased the garage business of David Brown Jr. and will continue it on a larger scale.

Detroit, Mich.—James M. Crawford, has resigned as assistant engineer of American Motors Co., to go with the Chalmers Motor Co. here.

Hartford, Conn.—The Palace Automobile Station has been sold by Fred W. and Joseph Dart to Thomas W. Metcalf. The Darts will continue as representatives of the Hudson, Studebaker and the Waverley electric lines.

Sheboygan, Wis.—The American Gas Engineering Co., recently organized at Sheboygan, by E. M. Parmelee, B. Lucas and L. L. Rowlands, has established a welding and general machinery plant as the nucleus of the gas engine business which its found-

ers intend to ultimately establish. Special attention will be given to motor car business.

Boston, Mass.—A. J. Kelly, formerly in charge of the B. F. Goodrich Co.'s Syracuse depot, has been transferred to the branch here.

Akron, O.—E. J. Hemington, formerly advertising manager for the Goodyear Rubber Co., has resigned to open an advertising agency here.

Portland, Ore.—The Oregon Motor Car Co., recently formed, will have the exclusive retail sales of Studebaker cars in Portland and Multnomah County. This company has succeeded the Multnomah Motor Car Co. Frank C. Riggs is president, E. R. Winchell, vice-president; W. C. Garbe, secretary and treasurer.

Manitowoc, Wis.—The Aluminum Goods Mfg. Co. of Manitowoc, Wis., has awarded contracts for the construction of additions costing \$45,000 and which will be completed by September 1. The company is a large producer of castings for motor car builders and will increase its output by 35 to 50 per cent when the additions are completed.

STROMBERG

Carburetors

The Stromberg is the simplest carburetor made, hence it is the one carburetor that is absolutely trouble-proof.

There is but one simple adjustment—that governing the air. The gas supply is automatically controlled by the regulation of air. The novice is as sure of a proper mixture as the expert—because there can be no direct “tinkering” with the fuel supply.

The turning of a single, easy-to-get-at nut increases or cuts down the supply of air, as required. The gas adjustment, so delicate and easy to get out of order in the old type of carburetor, has been eliminated. There is no direct gasoline ad-

justment on the Stromberg, and therefore nothing to be injured by inexperienced hands. The air control does it all.

If the mixture is too “lean,” a turn of the nut cuts down the air supply and creates a stronger suction on the gasoline. If too rich, another turn allows more air to enter and the gasoline supply is lessened. The nozzle suction is at all times under perfect control and more or less fuel is supplied at will.

The great trouble with the ordinary carburetor is that the inexperienced driver is at the

mercy of a delicate and complicated gas supply regulator. Without expert mechanical knowledge he may entirely cripple the carburetor by attempting to adjust this sensitive apparatus. This source of trouble has been entirely done away with in the Stromberg.

Our “Reason Why Talks” give many more features in which the Stromberg excels, and tell why you cannot afford to be without the best carburetor on your car. Your name and address will bring them, free and postpaid. Write today.

Stromberg Motor Devices Company
54 East 25th St., Chicago, Illinois

Branches

New York

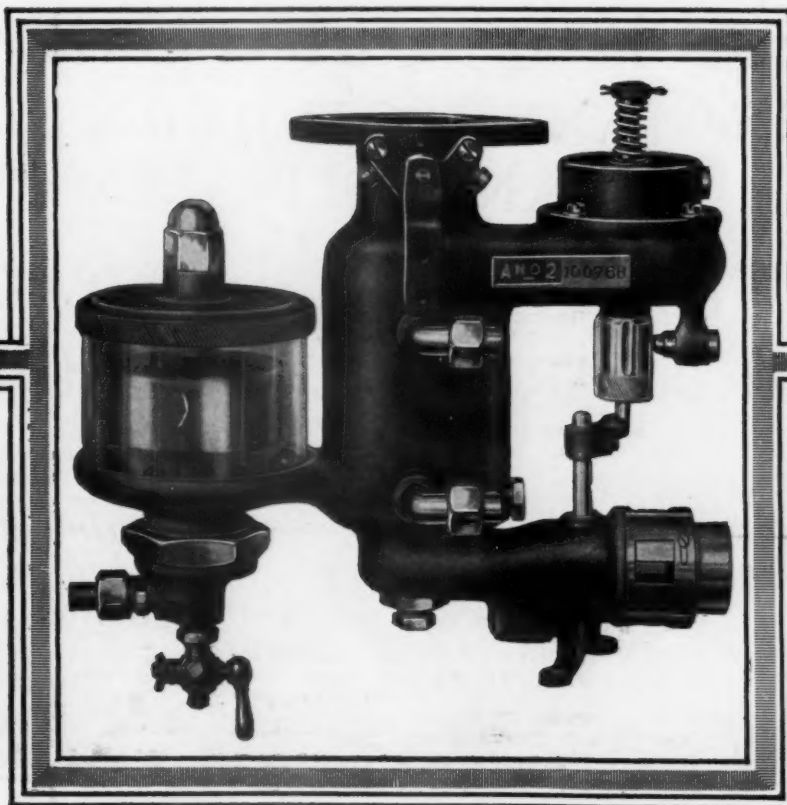
Boston

Detroit

Indianapolis

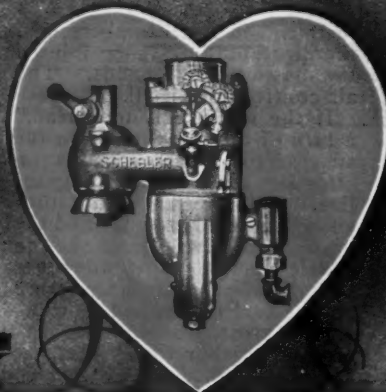
Minneapolis

Pacific Coast Distributors: Chansler and Lyon Co., Los Angeles, Portland, Fresno, Spokane, San Francisco, Seattle
 Canadian Distributors: Russell Motor Car Company, Toronto, Montreal, Hamilton, Winnipeg, Calgary, Vancouver



SCHEBLER

*The Aristocrat
of Carburetors*



"The Heart of the Automobile"

WHEELER & SCHEBLER

"Pioneers in Perfection" of Carburetion

MANUFACTURERS
INDIANAPOLIS U.S.A.

THE SCHEBLER IS THE ACKNOWLEDGED
STANDARD CARBURETOR OF THE WORLD

Branches

NEW YORK
BOSTON
PHILADELPHIA
ATLANTA
MINNEAPOLIS
KANSAS CITY
CHICAGO

DETROIT
DENVER
SAN FRANCISCO
LOS ANGELES
SEATTLE
MONTREAL CAN.
SIDNEY AUSTRALIA

Service Department

Distributors

Every city and town in
the United States and
Canada • Europe and
• Australia •

When Writing to Advertisers, Please Mention Motor Age.

Have you your Klaxon Instruction Book?

EVERY Klaxon, Klaxonet and Klaxet that leaves the factory is accompanied by an instruction book. This tells about the simple mechanism and the small attention required to insure the satisfactory operation of the instrument for an unlimited period of time.

Oftentimes—in spite of everything we may do to prevent it—this book does not get into the hands of the owner. Especially is this true where the Klaxon is installed on the car at the factory.

The instruction book is important. The information contained in it is essential to the proper care of your instrument. If you have never received one, send for one today.

THE Klaxon guarantee is as broad as we know how to make it. It covers the satisfactory operation of the instrument as long as the purchaser requires a warning signal. Above everything else the first consideration of this company is to make good this guarantee.

But it must be remembered that the Klaxon, like any other piece of mechanism, requires a certain amount of

attention. To insure its perfect operation it must occasionally be cleaned; it must also be oiled. Without small attentions of this kind it is bound eventually to operate unsatisfactorily.

Our experience has shown that the few cases of Klaxon dissatisfaction have invariably resulted from one of two things: either the owner did not know how to take the right care of his instrument—had never received our instruction book; or else he had carelessly neglected it. Occasionally he not only neglects its care, but when—after months without oil or cleaning the Klaxon fails to perform its work—the owner has taken it apart, made new adjustments and otherwise tampered with the mechanism. Herein has lain the cause of 99% of all Klaxon dissatisfaction—so easily avoidable by the observance of the simple rules set forth in the instruction book.

A postal card with your name and address on it, the name of your car and the *number of your instrument*, will bring an instruction book by return mail. Address Lovell-McConnell Mfg. Co., 208 Wright St., Newark, N. J.



KLAXONET

Lovell-McConnell Mfg Company Newark, N.J., U.S.A.

KLAXON

"The Public Safety Signal"



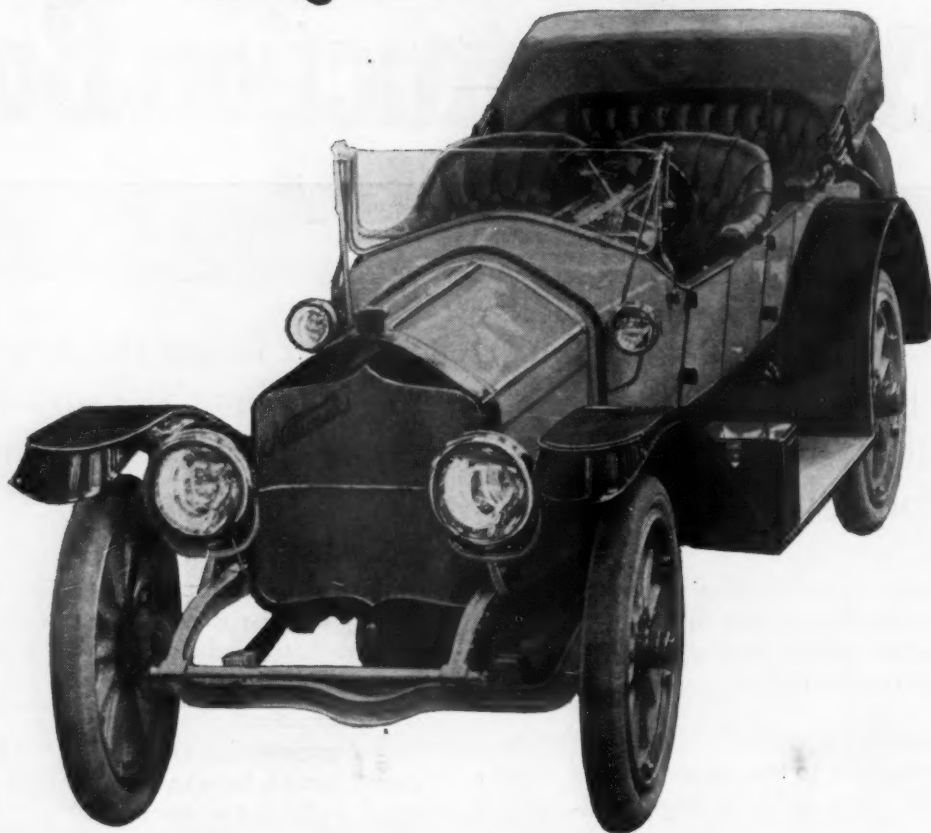
KLAXON

When Writing to Advertisers, Please Mention Motor Age.

Stock
Champion

National

International
Champion



COMFORT in a National is uniform, no matter where you drive.



Comfort is not a feature listed among the "specifications." It is the sum total of this car's quality. You don't see it—you enjoy it as a result.

Others may imitate the National's superb appearance and design but no other car can give you the same satisfaction.

SOME OF THE FEATURES THAT COMBINE TO GUARANTEE COMFORT IN A NATIONAL

CORRECT DESIGN
PROPER MATERIALS
CARE IN CONSTRUCTION
ELECTRIC SELF-STARTER
ELECTRIC LIGHTS
LEFT-SIDE DRIVE
DEEP UPHOLSTERY
PERFECTED CUSHION SPRINGS
ACCESSIBILITY OF PARTS

TIRE PUMP
FLEXIBLE MOTOR
NOISELESS OPERATION
EASE OF CONTROL
CENTER CONTROL
RELIABLE BRAKES
CORRECT BALANCE OF BODIES
ACCESS TO BOTH FRONT DOORS
MANNER IN WHICH CAR "HOLDS THE ROAD"

Our five models set the styles for the entire industry. Our prices—\$2,750 to \$3,400—are commensurate with our quality.

NATIONAL MOTOR VEHICLE CO., INDIANAPOLIS, IND.

Automobile Manufacturers Who Have Contracted For



Storage Batteries

Exclusively For Starting or Lighting or Both

Abbott Motor Co.	Detroit, Mich.	Marathon Motor Co.	Nashville, Tenn.
Allen Motor Car Co.	Fostoria, Ohio	Marion Motor Car Co.	Indianapolis, Ind.
Alpena Motor Car Co.	Alpena, Mich.	Maritime Motor Car Co., Ltd.	St. John, N. B.
American La France Fire Eng. Co.	Elmira, N. Y.	Martindale & Millikan	Franklin, Ind.
American Locomotive Co.	Providence, R. I.	Maxwell Motor Car Co.	Detroit, Mich.
American Motors Co.	Indianapolis, Ind.	Mercer Automobile Co.	Trenton, N. J.
Ames Motor Car Co.	Owensboro, Ky.	Metzger Motor Car Co.	Detroit, Mich.
Apperson Bros. Automobile Co.	Kokomo, Ind.	Michigan Buggy Co.	Kalamazoo, Mich.
O. Armleder Co.	Cincinnati, Ohio	Midland Motor Car Co.	Moline, Ill.
Auburn Automobile Co.	Auburn, Ind.	Moline Automobile Co.	East Moline, Ill.
Bartholomew Co.	Peoria, Ill.	Moon Motor Car Co.	St. Louis, Mo.
Buckeye Mfg. Co.	Anderson, Ind.	Motor Car Mfg. Co.	Indianapolis, Ind.
Canadian Standard Auto & Tract. Co.	Ft. Wayne, Ind.	Nance Motor Car Co.	Philadelphia, Pa.
Cartercar Co.	Pontiac, Mich.	National Motor Vehicle Co.	Indianapolis, Ind.
J. I. Case T. M. Co. Motor Works	Racine Jct., Wis.	Nordyke & Marmon Co.	Indianapolis, Ind.
Chadwick Engineering Works	Pottstown, Pa.	Norwalk Motor Car Co.	Martinsburg, W. Va.
F. Coleman Carriage & Harness Co.	Illion, N. Y.	Nova Scotia Carriage Co.	Kentville, N. S.
Columbus Buggy Co.	Columbus, Ohio	Nyberg Automobile Works	Anderson, Ind.
Commerce Motor Truck Co.	Detroit, Mich.	Oakland Motor Car Co.	Pontiac, Mich.
Corbitt Automobile Co.	Henderson, N. C.	Packard Motor Car Co.	Detroit, Mich.
Crawford Automobile Co.	Hagerstown, Md.	Paige-Detroit Motor Car Co.	Detroit, Mich.
Crescent Motor Co.	Cincinnati, Ohio	Palmer & Singer Mfg. Co.	Long Island City, N. Y.
Crow Motor Car Co.	Elkhart, Ind.	Paterson Wagon Works	Flint, Mich.
Croxton Motor Car Co.	Washington, Pa.	Peerless Motor Car Co.	Cleveland, Ohio
Jas. Cunningham Son & Co.	Rochester, N. Y.	Pilot Motor Car Co.	Richmond, Ind.
Cutting Motor Car Co.	Jackson, Mich.	Pope Mfg. Co.	Hartford, Conn.
Geo. W. Davis Carriage Co.	Richmond, Ind.	Premier Motor Car Co.	Indianapolis, Ind.
Elkhart Carriage & Harness Co.	Elkhart, Ind.	Pullman Motor Car Co.	York, Pa.
Enger Motor Car Co.	Cincinnati, Ohio	Regal Motor Car Co.	Detroit, Mich.
F. I. A. T. Company	Poughkeepsie, N. Y.	Reo Motor Car Co.	Lansing, Mich.
Flanders Motor Co.	Detroit, Mich.	Reo Motor Car Co. of Canada	St. Catharines, Ont.
H. H. Franklin Mfg. Co.	Syracuse, N. Y.	Russell Motor Car Co.	W. Toronto, Ont.
Gramm-Bernstein Co.	Lima, Ohio	Sayers & Scoville Co.	Cincinnati, Ohio
Gramm Motor Truck Co.	Lima, Ohio	Schacht Motor Car Co.	Cincinnati, Ohio
Gramm Motor Truck Co.	Walkerville, Ont.	Seagrave Co.	Columbus, Ohio
Great Western Automobile	Peru, Ind.	Selden Motor Car Co.	Rochester, N. Y.
Haberer & Co.	Cincinnati, Ohio	Simplex Automobile Co.	New Brunswick, N. J.
Havers Motor Car Co.	Port Huron, Mich.	A. O. Smith Co.	Milwaukee, Wis.
Haynes Automobile Co.	Kokomo, Ind.	Spaulding Mfg. Co.	Grinnell, Ia.
Henderson Motor Car Co.	Indianapolis, Ind.	Speedwell Motor Car Co.	Dayton, Ohio
Herreshoff Motor Co.	Detroit, Mich.	Stanley Motor Car Co.	Newton, Mass.
Ideal Motor Car Co.	Indianapolis, Ind.	F. B. Stearns Co.	Cleveland, Ohio
Imperial Automobile Co.	Jackson, Mich.	Stegeman Motor Car Co.	Milwaukee, Wis.
Jackson Motor Car Co.	Jackson, Mich.	Sternberg Mfg. Co.	Milwaukee, Wis.
Kelley-Springfield Motor Truck Co.	Springfield, Ohio	Stevens-Duryea Co.	Chicopee Falls, Mass.
King Motor Car Co.	Detroit, Mich.	Stoddard-Dayton Co. (Maxwell)	Dayton, Ohio
Kline Motor Car Co.	Richmond, Va.	Studebaker Corporation	Detroit, Mich.
Knox Automobile Co.	Springfield, Mass.	The Tudhope Motor Car Co.	Orillia, Can.
Lenox Motor Car Co.	Boston, Mass.	Vellie Motor Vehicle Co.	Moline, Ill.
Lexington Motor Car Co.	Connersville, Ind.	Warren Motor Car Co.	Detroit, Mich.
Little Motor Car Co.	Flint, Mich.	Wayne Works	Richmond, Ind.
Locomobile Company of America	Bridgeport, Conn.	Webb Co.	Allentown, Pa.
Lozier Motor Car Co.	Detroit, Mich.	Westcott Motor Car Co.	Richmond, Ind.
Lyons Atlas Co.	Indianapolis, Ind.	White Company	Cleveland, Ohio
W. H. McIntyre Co.	Auburn, Ind.	Wichita Falls Motor Co.	Wichita Falls, Tex.
McLaughlin Motor Car Co.	Oshawa, Ont.	Winton Motor Car Co.	Cleveland, Ohio
		Zimmerman Mfg. Co.	Auburn, Ind.

NEED WE SAY MORE?

WILLARD STORAGE BATTERY CO., Cleveland, Ohio

WHY? WHEN?

It's the Last Word in
Carburetor Construction

At All Times

HOLLEY CARBURETOR

A Prediction Fulfilled

A year ago when the new self-adjusting Holley, the carburetor with no-moving-parts and only one adjustment, was put upon the market, we made a prediction that our competitors would be compelled to copy it or go out of business—so far in advance of ordinary carburetor construction was that of the new Holley.

Indeed, two months after this prediction was made, we had the satisfaction of seeing 100,000 orders on our books.

While skeptical at first, the more experienced engineers gradually became convinced that here at last was the ideal "fool proof" carburetor—a mixing device upon which they could rely and which in competitive tests with over 32 different makes, unquestionably showed its superiority in regulation and in economy of operation.

Furthermore, due to its temperature regulator, it was found able to cope successfully with variable climatic and altitudinal conditions.

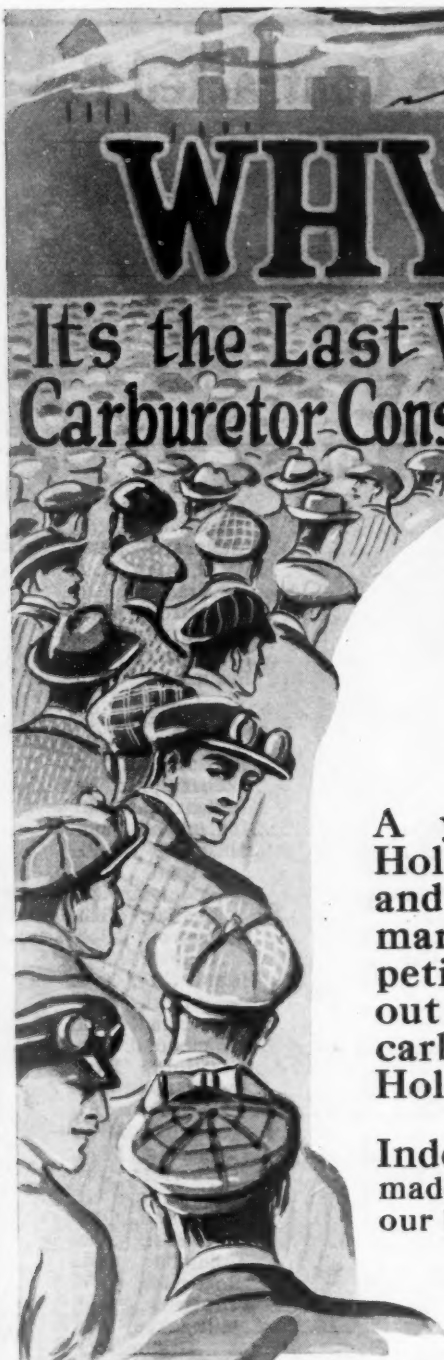
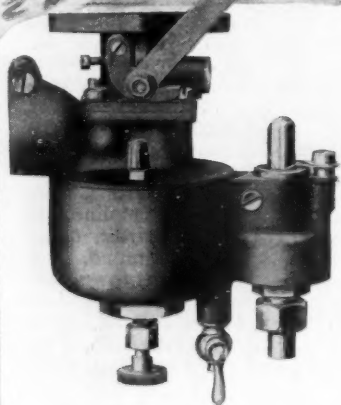
Holley Brothers Company

AUTOMOBILE SUPPLY CO., 1335 Michigan Blvd., Chicago, Ill.

OMAHA RUBBER CO., Omaha, Neb.

FOREIGN BRANCH: Holley Bros. Co., Coventry, England

NO MOVING PARTS



WHERE? WHAT?

Everywhere

HOLLEY

CARBURETOR

The Result

Over half the gasoline cars manufactured in the United States are now equipped with Holley carburetors.

Our entire 1913 output is sold.

Over 1000 carburetors leave our plant every day, and yet we cannot keep pace with the demand.

We have made, and are still making extensive efficiency changes in our methods of manufacture.

In 1914 we hope to be able to handle the increasing volume of our business successfully, and to that end are making advanced plans.

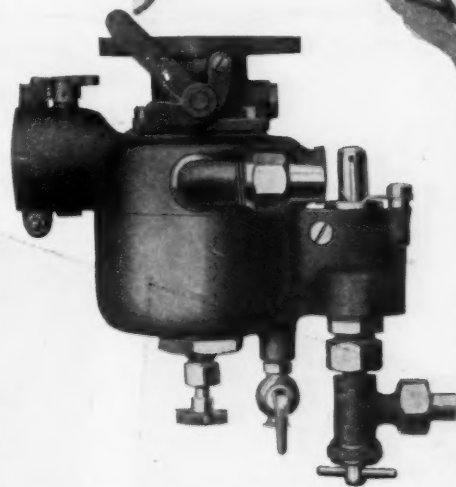
We ask your assistance.

Please give us your specifications and orders as early as possible.

1914 models now ready for demonstration.

130 Rowena St., Detroit, Mich.

Holley Carburetors are carried in stock at the following
HAS. E. MILLER Stores, New York City, 97-103 Reade St. and 121 Chambers St.
 New York City.....924 Eighth Avenue
 Between 54th and 55th Streets
 New York City.....2782 Broadway
 Between 107th and 108th Streets
 Brooklyn, N. Y.....1421 Bedford Avenue
 Buffalo, N. Y.....824 Main Street
 Albany, N. Y.....135 Central Avenue
 Boston, Mass.....202-204 Columbus Ave.
 Springfield, Mass., Bridge & Dwight Sts.
 Hartford, Conn.....274 Trumbull Street
 Detroit, Mich. 227-229 Jefferson Ave
 Cleveland, Ohio.....1829 Euclid Ave.
 Philadelphia, Pa.....318 N. Broad St.
 Atlanta, Ga.....66 Edgewood Avenue
 New Orleans, La.....601-603 Baronne St.
 Newark, N. J.....274 Halsey Street



ONLY ONE ADJUSTMENT

Ready for Anything at any time

For each and every condition there's a particular feature of safety and service in

PENNSYLVANIA *Oilproof* VACUUM CUP TIRES

The suction hold of the vacuum cups, guaranteed to prevent skidding on wet or greasy pavements—

The absolutely oilproof quality, immune against deterioration from oily roads and garage floors—

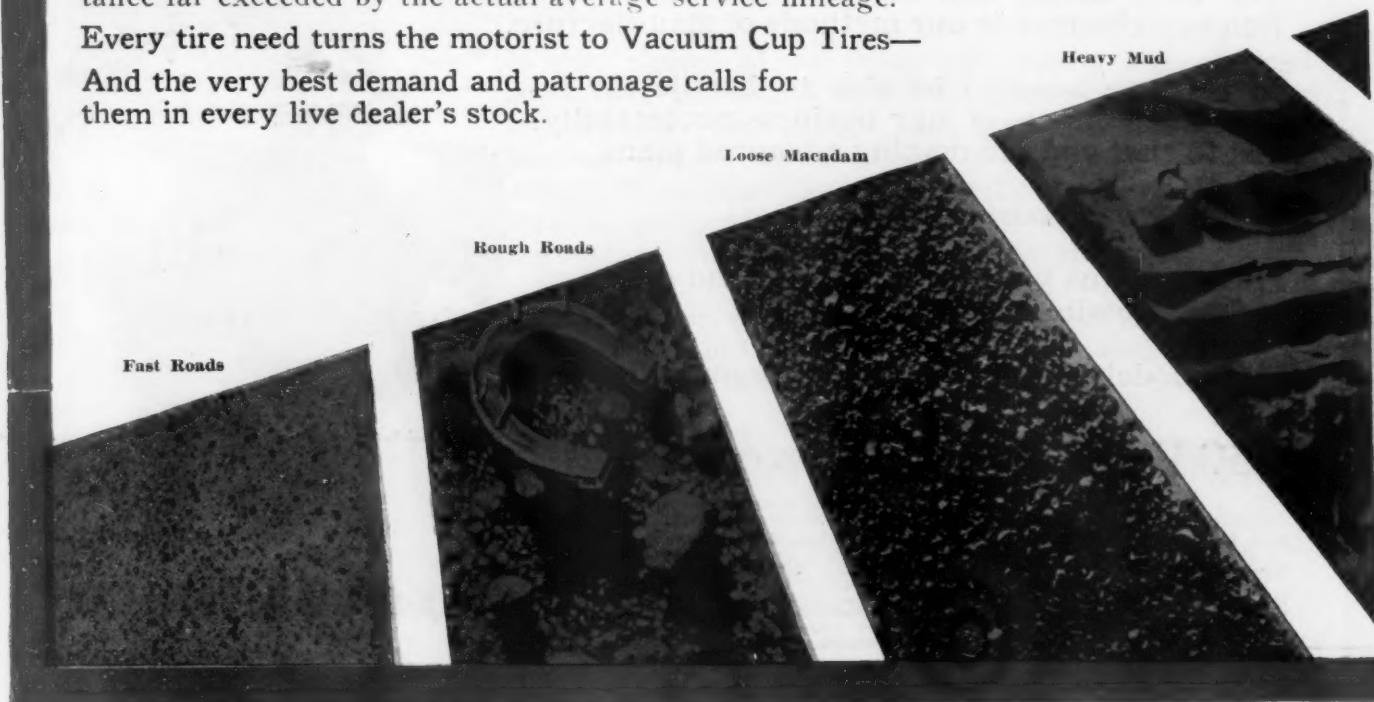
The thick-walled cups that drive deep and give unequalled traction in mud or sand—and thrust aside sharp stones and puncturing objects—

The extreme toughness and phenomenal heat radiating powers of the tread, offering the utmost resistance to the abrasion and friction of fast travel over fine roads—

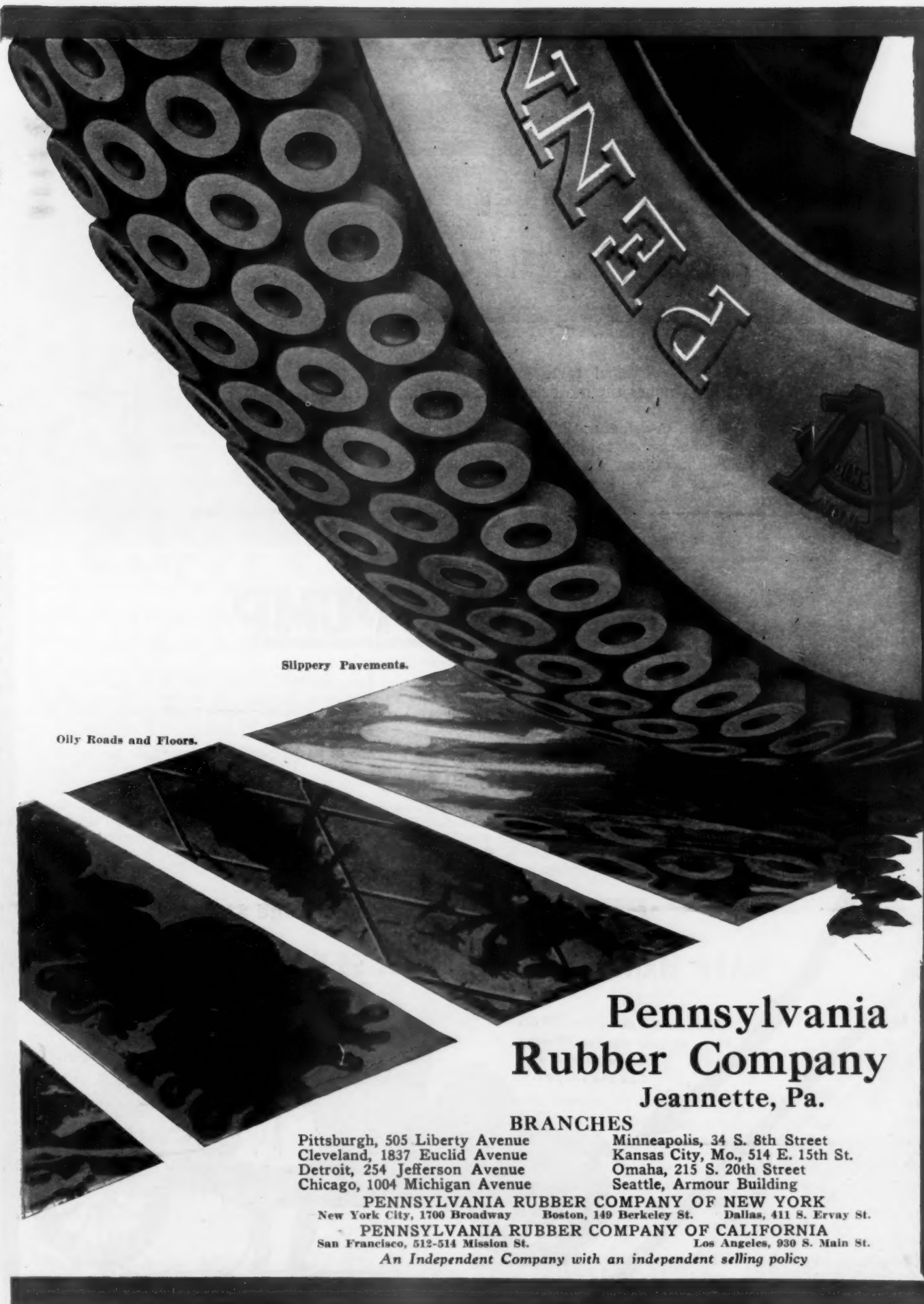
And finally the definite printed guarantee of 4,000 miles attached to each casing—a distance far exceeded by the actual average service mileage.

Every tire need turns the motorist to Vacuum Cup Tires—

And the very best demand and patronage calls for them in every live dealer's stock.



When Writing to Advertisers, Please Mention Motor Age.



Slippery Pavements.

Oily Roads and Floors.

Pennsylvania Rubber Company

Jeannette, Pa.

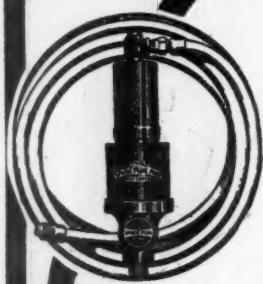
BRANCHES

Pittsburgh, 505 Liberty Avenue	Minneapolis, 34 S. 8th Street
Cleveland, 1837 Euclid Avenue	Kansas City, Mo., 514 E. 15th St.
Detroit, 254 Jefferson Avenue	Omaha, 215 S. 20th Street
Chicago, 1004 Michigan Avenue	Seattle, Armour Building
PENNSYLVANIA RUBBER COMPANY OF NEW YORK	
New York City, 1700 Broadway	Boston, 149 Berkeley St.
PENNSYLVANIA RUBBER COMPANY OF CALIFORNIA	
San Francisco, 512-514 Mission St.	Los Angeles, 930 S. Main St.

An Independent Company with an independent selling policy

When Writing to Advertisers, Please Mention Motor Age.

"This Is Just Physical Torture"



It is physical torture because a hand pump makes the motorist work with it. A hand pump without 2 strong arms and a strong back behind it is nothing but a useless piece of tubing with a piston in it. The purchase of a hand pump is an agreement on the part of the motorist who buys it to blister his hands, to stream perspiration, to strain his back, waste his time, and spoil his motoring pleasure.



MAYO ^{SPARK} PLUG PUMP

THE MAYO SPARK PLUG PUMP, when it comes to inflating tires, lets the motorist out. It pumps tires for, not with him. It uses the motor's muscles—permits him to save his. He can sit on the running-board and watch the motor do the work, 5 times faster than he could with a back-racking hand pump. And his wife can pump tires as well as he.

Some motorists still consider a hand pump an economy because of its low initial cost. Apply to the cost of a MAYO what you would ordinarily pay for a good hand pump. Use the MAYO and it will make up the difference by paying for itself in the physical discomfort it saves you.

The MAYO is instantly attached by substituting it for any spark plug. It pumps nothing but pure, fresh air. Inflates the largest tire in from 2 to 4 minutes. Built with metal rings like your motor and will last as long. Adaptable to all size cars from the smallest FORD to the largest LOZIER. An occasional drop of oil is the only attention it ever requires. Weight, 2½ pounds. Fits nicely into the tool box. Complete with 12 feet of hose and connections.

PRICE \$10. Pressure Gauge \$2 Extra

MAYO MANUFACTURING CO., 55 E. 18th St., Chicago, Ill.

You can use this pump **FREE**
on your car for 30 days
before purchasing.
Use the coupon.

MAYO MFG. CO., 55 E. 18th St., Chicago, Ill.
Gentlemen: Kindly send me particulars about your 30 day
free trial offer.
Name
Address
.....
.....



This Is Just Perfect Comfort

When Writing to Advertisers, Please Mention Motor Age.



Marion 37-A five-passenger touring car, fully equipped, \$1475

Marion

NOTE THESE FEATURES

English Steel Springs
Pressed Steel Frame
Three-Point Suspension
Drop-Forged Front Axle
Double-Trussed Rear Axle
Large, Efficient Brakes
Strong Steering-Gear
Expensive Bearings
Circulating Lubrication
Roomy Metal Bodies
Deep Upholstering
Electric Lights
Self-Starter

THE MARION LINE

37-A Touring, 30-40 hp. \$1475
36-A Bobcat, 30-40 hp. . 1425
38-A Roadster, 30-40 hp. 1475
48-A Touring, 48 hp. . . . 1850

Send for a copy of our new art catalogue—a book in form and treatment of its subject. You'll find an unusual thought on the motor car purchase in it.

This Car's Strength Insures Satisfaction

Marion Cars are made just as strong as is possible. The material and workmanship are the best obtainable. Each car in being built is subjected to tests which owners never equal.

This is done purposely. It proves that these cars will give absolutely satisfactory use in the hands of their purchasers. You could run a Marion day after day over the worst roads and it would "stand up."

The racking a Marion will take and still give perfect service is wonderful. Long life, economy and dependability are Marion features.

They are refined and handsome—the greatest family cars of the 1913 season. Completely equipped, large and luxurious, powerful and silent.

To see the newest Marion cars just call upon any Marion dealer—we have established an unusually extensive sales organization. If you like we'll be glad to give you the name and address of the Marion representative nearest you. Where territory is open we will appreciate correspondence with solid, reputable business men.

The Marion Motor Car Company, 902 Oliver Avenue, Indianapolis



Dealers!

NEW ERA TIRE TREATMENT is the first practical solution of the tire problem ever offered. It is not an experiment. It has been in use on a fleet of test cars for over a year. It has proved itself as revolutionary as the self-starter and much more necessary. Every man who drives a car will have to come to it—sooner or later.

Are you going to get exclusive control of your territory, now, before the dealer across the street does? Write or wire us collect for a dozen of each size can. You may get first consideration as our exclusive agent in your city. Prepare a tire—demonstrate it—and NEW ERA will sell itself.

We will guarantee our wholesale price satisfactory or you may refuse the goods. Use the coupon.

Satisfaction

Guaranteed or
Your Money
Refunded

Motorists! Have your tires treated with NEW ERA. Try it for 90 days. If you are not satisfied at the end of that time, your money will be cheerfully refunded—and no questions asked. NEW ERA is to be had at your dealer's, or in case he is not yet supplied, direct from us. Sent C. O. D., prepaid, or by parcel post if price accompanies order. Use the coupon.

Prices

- 1 can No. 1, enough for 2 motorcycle tires...\$ 4.00
- 2 cans No. 2, enough for 4 auto tires, 3 or 3½" .. 10.00
- 2 cans No. 3, enough for 4 auto tires, 4, 4½ or 5" 15.00
- 4 cans No. 2, enough for 4 auto tires, 5½ or 6" 20.00

Simple instructions and binding guarantee with each can.

We refer you to any trade paper or automobile jobber as to our integrity of 20 years' standing.

Let the
Punctures
Take Care of
Themselves

NEW ERA TIRE TREATMENT makes punctures self-healing. They repair themselves automatically—save you the trouble of fussing and fuming with tire irons, tire cement, sand paper and patches in the heat and dust of the road. "Run over a nail and ride on," is the slogan of the NEW ERA Motorist.

NEW ERA is not a filler. Tire fillers cause jar, tend to crystallize axles, increase car weight, put extra strain on the engine. NEW ERA does none of these things. NEW ERA is a fluid—a comparatively small amount of which is injected into your inner tubings through the valve stems. The weight it adds to a car is negligible. The resiliency of your tires is in no way affected.

When you get a puncture, the air pressure within the inner tube forces a small amount of fluid into the opening made. The fluid coagulates, the puncture is instantly and permanently sealed.

NEW ERA is absolutely harmless. It preserves rubber—doubles the life of inner tubes. It is a sure cure for porous inner tubes. It stops "slow leaks." Any one can treat a tire with NEW ERA in 15 minutes' time.

DEALERS get your order in today so as to supply the demand.

Smalley Daniels
Sole Distributor
247 E. Jefferson, Detroit, Mich.

SMALLEY DANIELS, 247 E. Jefferson St., Detroit, Mich.

Dear Sir: Kindly send me _____ cans No. 1 NEW ERA TIRE TREATMENT, _____ cans No. 2, _____ cans No. 3 prepaid by (Express or Parcel Post). Payment enclosed.

Name _____

Address _____

(COUPON)

When Writing to Advertisers, Please Mention Motor Age.

Stewart Speedometer

MAGNETIC PRINCIPLE



Model B
\$50

THE Stewart (magnetic) Speedometer is just that much in advance of all the other types of speed indicators as the modern four and six cylinder motor is in advance of the old one and two cylinder motor.

It is a fact that no other single patented automobile accessory or part is used and endorsed by such an overwhelmingly large majority of motor car manufacturers as the famous magnetic speedometer — like the Stewart.

This year, 220 automobile manufacturers are equipping their

cars with speedometers, and 216 out of this 220 use the magnetic speedometer exclusively.

See that you get or have a Stewart on your car. Its readings guarantee you an absolutely accurate check on your gasoline and oil consumption, tire mileage and the efficiency of your motor.

The Stewart Speedometer Factory

1931 Diversey Blvd.

Chicago, U. S. A.

Service Stations in every important city in the world



Crimped Cap

Educational Series—No. 2

The cap of a RED HEAD Plug will not become loose. It is cemented to the porcelain by curing and baking processes, then the cap is crimped under the shoulder at the top of the porcelain.

Guarantee slip in every RED HEAD Spark Plug carton.

Red
TRADE

Red Head

Emil Grossman Company
New York — Detroit

Trenton, N. J.

London, Eng.

When Writing to Advertisers, Please Mention Motor Age.

You used to drive your car as a "stunt"



In another year or two, automatic control will be universally demanded. You will want to be in the forefront. Write your name and address on the margin of this page and we will send you our Booklet "A" and full particulars of the Atwater Kent System without obligation on your part.

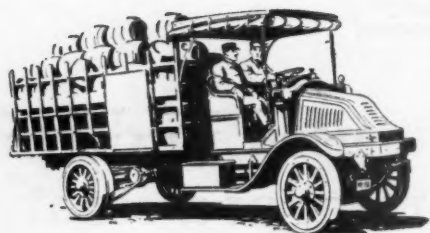
ATWATER KENT MFG. WORKS

4934 Stenton Ave., Philadelphia, Pa.

DISTRIBUTORS

New York, E. J. Edmond Co.; Chicago, Motor Car Supply Co., Pellets Magneto Exchange; San Francisco, Chanslor & Lyon Co., Weinstock-Nichols Co.; Los Angeles, E. A. Featherstone; Seattle, Chanslor & Lyon Co.; Portland, Ballou & Wright; Omaha, Omaha Rubber Co., Powell Auto Supply Co.; Dallas and Houston, Fisk Co. of Texas; Wichita, Hockaday Auto Supply Co.; St. Louis, Missouri Auto Specialty Co.; Salina, Lee Hardware Co.; Kansas City, Kansas City Auto Supply Co.; Milwaukee, Julius Andrae & Sons Co.; Detroit, Automobile Equipment Co.; Boston, Motor Supply Shop; Denver, Auto Equipment Co.; Hartford, Post & Lester Co.; Atlanta, Elyea-Austell Co., Chattanooga, Southern Auto & Supply Co.

When Writing to Advertisers, Please Mention Motor Age.



100% Truck Efficiency —That's Kelly Service

"Take care of our users" is the keynote of Kelly Service.

Do you realize what this kind of service means to the agent who sells a Kelly Truck?

Kelly service is legitimate service in every sense. We can give this real service because we have built up the entire Kelly organization with that idea in mind.

We operate well-equipped factory branches and service stations in the following centers:

Boston	San Francisco
Providence	New York
Worcester	Philadelphia
New Haven	Birmingham
Cleveland	Kansas City
Chicago	Dallas
Seattle	Los Angeles

No matter where you may be, you are within a few hours of one of these service stations. The necessary parts or equipment for any repairs can be dispatched to you from one of these stations without an instant's delay. The advantage of this plan can be seen readily by those who have often been compelled to wait many days for repair parts to be sent from a distant factory.

You have to know Kelly Service before you can really appreciate what it means to our dealers.

KELLY SERVICE

THE KELLY-SPRINGFIELD MOTOR TRUCK COMPANY
803 Burt Street, Springfield, Ohio

(21)




STEWART MOTOR CORPORATION, Buffalo, N. Y.

Without obligation to me please tell me
your plan for increasing my profits.

Name

Address



\$1650

Stewart Delivery Cars

A COMPLETE line of high-grade delivery cars, built by experienced makers, combining all the best features. No other delivery car combines such striking features, every one of well-proven merit.

Every mechanical unit simple, accessible and quickly removable without disturbing load.

Trucking complications have been eliminated.

Remarkably quiet and easy riding.

Stiff, smooth frame, long stroke motor.

Special 150, 200 and 250 horse power.

Selective Timken Axle system.

Multiple transmission of ratios.

Light hand steering, nickel plated gears with Timken roller bearings.

Removable rear axle.

Large, roomy body, big tire control.

Exposed metal parts well made, beautifully painted and finished.

No brass in paint.

The Men Behind Stewart Delivery Cars

STEWART MOTOR CARS are designed and built by men who have had the widest experience in the manufacture of motor-driven vehicles.

Stewart Motor Corporation, T. R. Lippard, president and manager of the Stewart delivery car, and vice president of the corporation.

Mr. Lippard was formerly vice president of the corporation.

Stewart Motor Corporation, Buffalo, N. Y.

Write Today For This Book

and learn how other dealers are increasing their net profits

If we can show you a way to add substantially to your business—without increasing your overhead—you want to know it, don't you?

Here is the best money-making proposition ever offered motor car dealers. A selling proposition with a practically unlimited market; no seasons; no trading; no yearly models; repeat orders assured.

Many of the best dealers in the country are taking up the Stewart proposition and making money at it—such as the Packard dealers in Rochester, N. Y., Houston, Tex., and other cities; the Alco dealers in Baltimore and Pittsburgh; the Hudson dealers in San Francisco, Philadelphia, Wilmington; the Chalmers and Cadillac dealers in a number of other cities. In addition, companies have been formed in New York, Boston, Los Angeles, Chicago, Cleveland, Salem, Mass., and Portland, Ore., to handle Stewart delivery trucks exclusively.

Live dealers everywhere are realizing the wonderful sales possibilities of the Stewart and are eagerly taking on the line. In the last ninety days

more than 1300 Stewart trucks have been placed under contract.

Our proposition to you is simple and very attractive—a profit-maker from the start. Our contract is liberal and does not require heavy deposits.

You don't need to be an engineer or a technical traction expert. The same selling ability that makes you successful as a touring car dealer will earn big money for you in handling the Stewart—if you follow our plan.

We offer you something that will appeal at once to practically every business house—a car that will sell itself. No mystery about it; no risk. A proposition that has made and is making money for scores of keen, hard-headed dealers everywhere.

Our literature tells how you can cash in on this—how you can add largely to your earnings with practically no increase in your expenses.

Send in the coupon for our plan. It does not cost you anything to look into this. And, if your territory is still open, a letter or post card today may mean a good many dollars in your bank account a year from now.

Stewart Motor Corporation, Buffalo, N. Y.

T. R. Lippard, Pres. and Mgr. R. G. Stewart, V. P. and Ch. Eng'r. R. P. Lentz, Secy. and Treas.

Vitalized Rubber Diamond (No Pinch) Tires

answer your demand for More Mileage



Our chemists have discovered a scientific process of toughening pure rubber.

All types of Diamond Tires are now made of Vitalized Rubber—a flint-like, road-resisting rubber that retains all the young, lusty vigor of the pure gum with no loss of elasticity.

Perfect 3-Point Rim Contact an additional Diamond advantage

Our Engineers have built up and torn down thousands of experimental tires in an effort to produce a perfectly constructed tire that would give you the "More Mileage" tire you have demanded.

In Diamond Tires today each thread of fabric and every ounce of rubber is combined to give the greatest strength and resistance, with no unbalanced strains at unsupported points—*Perfect 3-Point Rim Contact*.

Add to these advantages the No-Pinch Safety Flap for inner tube protection, and, if you wish, the now famous Diamond Safety (Squeegee) Tread and you have absolutely the most satisfying tire money can buy.

So this time buy Diamond Vitalized Rubber Tires—you can get them to fit your rims at any of the



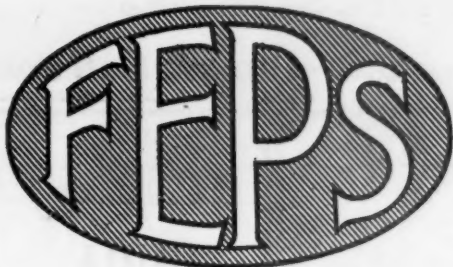
*Cross Section of Diamond
Safety Tread Tire*

Be a Diamond Dealer

If you are not a Diamond Dealer—now is the time to get in line. There is a Diamond Branch near you—get in touch today.

25,000 Diamond Dealers always at your Service

"A Giant in Power"



THERE is probably no better way to convince motor car owners of the merits of the Feps Carburetor than to publish here a few extracts from voluntary letters received from enthusiastic Feps owners.

You will note that these letters do not emanate from any particular locality but range practically from coast to coast, which demonstrates conclusively that climatic conditions are powerless to affect the consistent performance of the Feps, due to its freedom from all springs, and other complicated moving parts.

The Feps Carburetor actually reveals your car to you. The immediate response to the slightest touch of the throttle, the unusually quick pick-up, the absolute freedom from loading up and back-firing, the increased power, the great flexibility and the mileage increase of from 25% to 50% per gallon of fuel are a few Feps features that in a few months have made this carburetor so immensely popular.

You can prove these claims on your own car at our risk. If there is not a Feps dealer in your town

Write Dept. "A" for descriptive, illustrated Booklet

.....Would state that I am very much pleased with the Feps Carburetor as it is saving me fully 50% on my gasoline bill, beside giving extra power and more flexibility of motor.

Thanking you for your courtesy,
Yours very truly,
Signed: C. W. COURTNEY,
Los Angeles, Cal.

.....Carburetor which you sent me is in use at the present time on my Bergdoll car.
It is a decided improvement over any carburetor that I have yet tried.

Signed:
D. A. McCONNELL, Vice Pres.,
Lovell, McConnell Mfg. Co.,
Newark, N. J.

Owing to the great success I have had by the installation of the Feps Carburetor on my Pierce Arrow limousine, I feel it my duty to recommend the same.

.....It takes any reasonable hill on high gear and runs as smoothly as an electric.

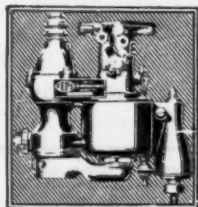
Signed:
G. LEVERING WILSON, Pres.,
Pennsylvania Building Co.,
Philadelphia, Pa.

Carburetor sent works splendid on Model 25 Studebaker car and customer is delighted with same. Can sell a great number.

Signed: A. C. STAACKE AUTO CO.,
San Antonio, Texas.

Enclosed find check to pay for carburetor which.....I find works O. K.

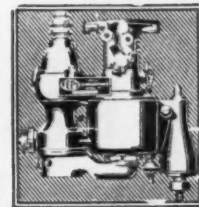
It is all you claim for it.
Signed: J. A. STRATHDEE,
Bedford, Ohio.



Schoen-Jackson Company Media, Pa.

FEPS DISTRIBUTORS AND SERVICE STATIONS




New York Factory Branch: 1777 Broadway Philadelphia: Fischer Auto Supply Co., 1415 Filbert St.
Boston: Motor Supply Shop, 883 Boylston St. Pittsburgh: Automobile Supply Co., Hartje Bldg.
Hockaday Auto Supply Co., Wichita, Kan.



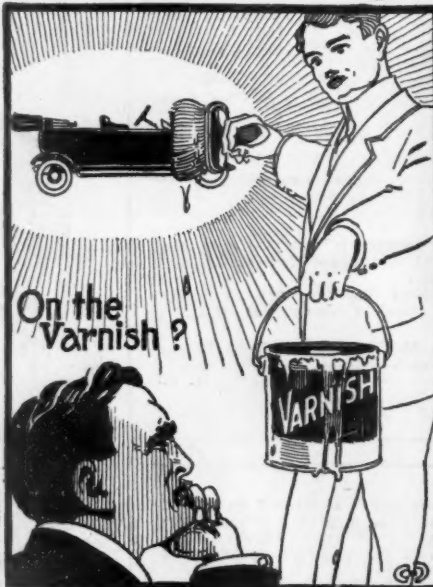
"A Miser in Fuel"

When Writing to Advertisers, Please Mention Motor Age.

Mr. Manufacturer! Which way do YOU Train Your Salesmen?

To Sell Your Car  || or, to Sell Your Car  || or, to Sell Your Car 

(as it ought to be sold)



Mr. BUYER: which of these ways do YOU want to be Sold?

That manufacturer who credits you, Mr. Buyer, with so *little intelligence* that he would ask you to buy his car on its *paint*, or on his *salesman's ability as an elocutionist*—would not hire you on your *clothes* or on your *eloquent promises* if he *were* buying your services as a salesman—he would insist upon seeing evidence of your *ability to "produce."*

Well, what BRAINS are to a MAN, the MOTOR is to a CAR, and hence it so steadily happens that the

Pleasure Cars:

Hudson Motor Car Co.
Michigan Motor Car Co.
Henderson Motor Car Co.
Lenox Motor Car Co.
Schacht Motor Car Co.
Spaulding Mfg. Co.
Croston Motor Co.
Nova Scotia Carriage and Motor Car Co.
Miller Motor Car Co.
Illinois Automobile Co.
and others.

BUDA

MOTOR

"is the part that sells the car."

Trucks:

Service Motor Car Co.
Bowling Green Motor Car Co.
Durant-Dort Carriage Co.
Hewitt-Ludlow Auto Co.
Tiffin Wagon Co.
Brantford Motor Truck Co.
Bessemer Motor Truck Co.
Available Truck Co.
Dart Mfg. Co.
Krebs Commercial Car Co.
Famous Mfg. Co.
Trabold Truck Mfg. Co.
The W. H. McIntyre Co.
W. Landshaft & Sons.
Harvey Motor Truck Co.
Hurlburt Motor Truck Co.
Schacht Motor Car Co.
Chicago Pneumatic Tool Co.
Lord Baltimore Motor Car Co.
U. S. Government, and others.

It has (among other special merits) the BUDA special oiling device, exclusive *get-at-ability*, etc., which has enabled us to sell BUDA Motors to such prominent manufacturers as represented in the above *partial list*.



Model "SS" Buda "Little Six"

The Buda "Little Six"

is now ready for delivery and is a product worthy of the Company which was the Pioneer of the "Cast-in-Block" method in U. S.

Send for SPECIAL BULLETIN to

Go back to the top and study that picture.

BRANDENBURG & COMPANY

1108 S. MICHIGAN AVE., CHICAGO

57TH & BROADWAY, NEW YORK

FORD BLDG., DETROIT

1914 SPECIFICATIONS:

Model "SS"	6 Cylinder Motor	3 1/2 x 5 1/2
Model "T"	4 Cylinder Motor	4 1/2 x 5 1/2
Model "O"	4 Cylinder Motor	4 1/2 x 5 1/2
Model "Q"	4 Cylinder Motor	3 1/2 x 5 1/2
Model "M"	4 Cylinder Motor	3 1/2 x 4 1/2

Model "SS" furnished either as separate Motor or with Bell Housing Crank Case.
Models "T," "O" and "Q" furnished either as separate Motors or with Bell Housing Crank Cases. Also either for sub-frame or main frame support.
Model "M" furnished in separate type only for sub-frame support.

When Writing to Advertisers, Please Mention Motor Age.

SPECIFY GILBERT MOTOR CAR ACCESSORIES

Water-Proof Tire Covers

that fit and wear add to the appearance
of your car and protect your
spare tires absolutely

Designed to fit without a wrinkle and
with provision made for all pro-
jecting rim parts

Lamp Covers

Magneto Covers

Tube Cases

Tool Rolls

Tool Kits

Tire Brackets

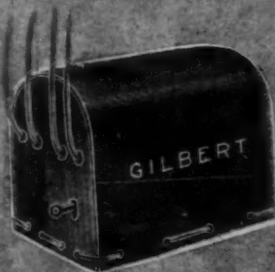
End Thrust

Boots, etc.



Send for Our
Latest
Catalogue

AND
GET
THE
BEST

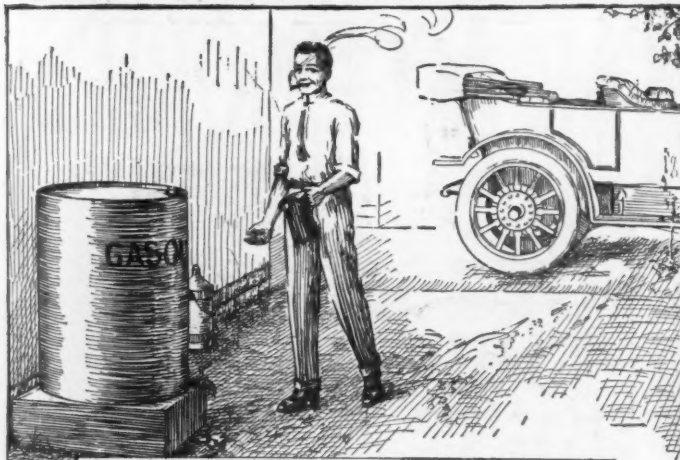


Everything for
Your Car

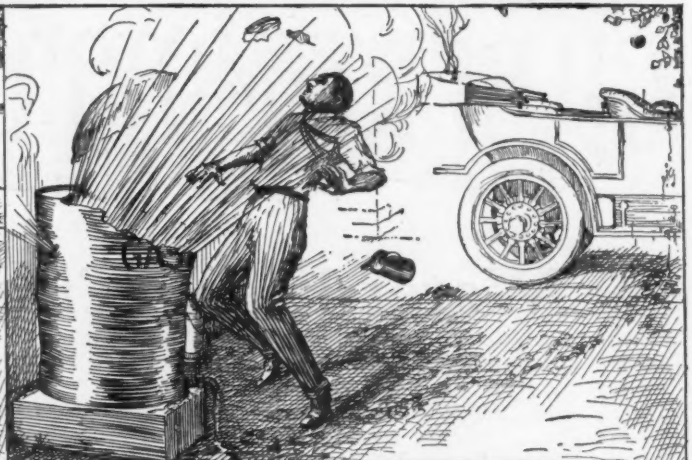
GILBERT MFG. CO., New Haven, Conn.
New York Branch, 2010 Broadway, Cor. 68th Street

58B

MR. HARD-TO-CONVINCE'S OBJECT LESSON



"Humph! every time I think of that salesman's talk about 'air-tight' above-ground gasoline tanks I have to laugh. Of course, they cause a little more work—but the exercise is good for one."



"There, that's nine gallons. One more trip and I think the tank has enough. ... Swish! ... Bang! ... Gee Whiz! Who'd o' thought it?"



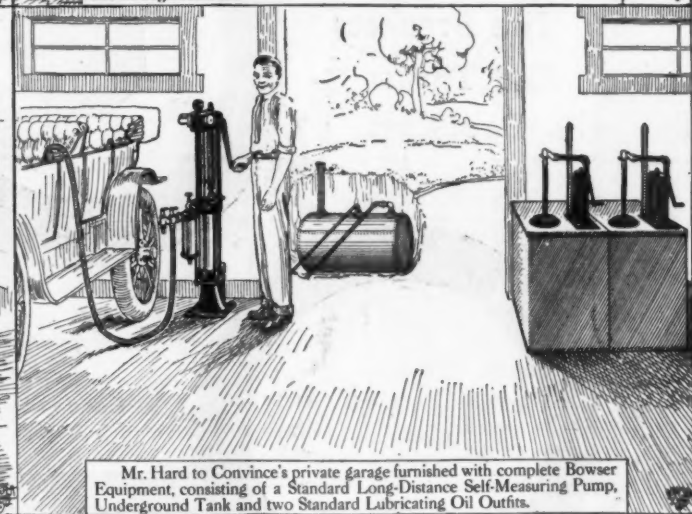
"Never again, nurse, never again! They saved the car, eh? Well, that's some consolation, but never again above-ground storage for liquid gun-powder."



"There, James, just cart the remains of that alleged 'air-tight' oil can and those lubricating oil makeshifts to the dump heap. Be sure and put an axe through them all."



"Now, can you ship immediately? Good! You say they are made to conform to that measure of safety prescribed by the National Board of Underwriters? Well, here's my check. Good-bye."



Mr. Hard to Convince's private garage furnished with complete Bowser Equipment, consisting of a Standard Long-Distance Self-Measuring Pump, Underground Tank and two Standard Lubricating Oil Outfits.

S.F. Bowser & Co., Inc. Home Plant and General Offices, Box 2126 **Ft. Wayne, Ind., U.S.A.**

SALES OFFICES IN ALL CENTERS AND REPRESENTATIVES EVERYWHERE

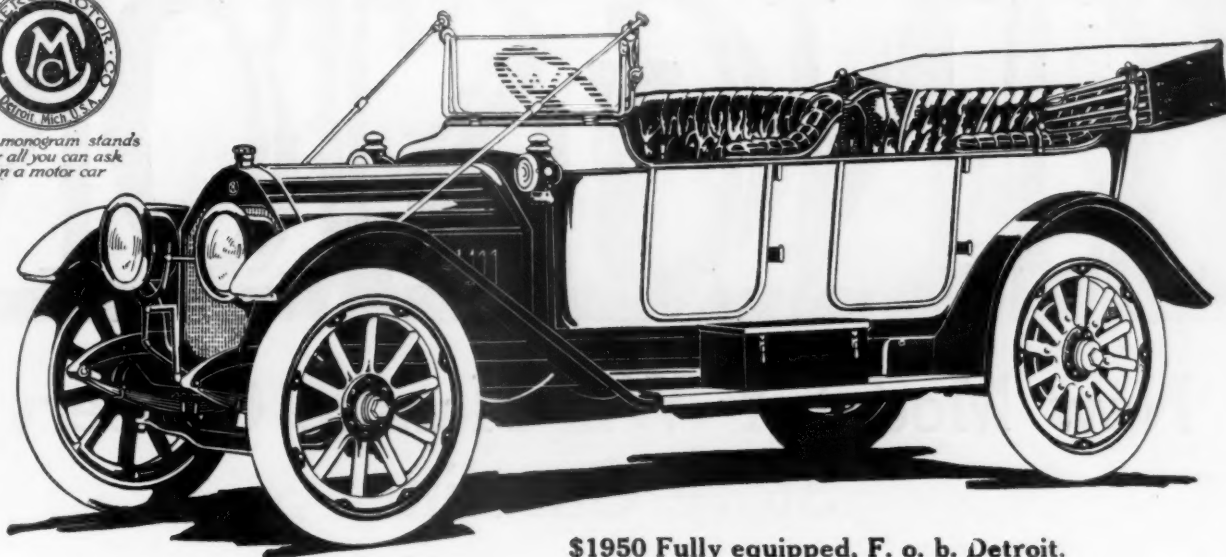
Original patentees and manufacturers of standard, self-measuring, hand and power driven pumps, large and small tanks, gasoline and oil storage and distributing systems, self-registering pipe line measures, oil filtering and circulating systems, dry cleaner's systems, etc.

ESTABLISHED 1885

When Writing to Advertisers, Please Mention Motor Age.



*This monogram stands
for all you can ask
in a motor car*



\$1950 Fully equipped, F. o. b. Detroit.

Chalmers "Thirty-Six" gives the answer to both

—to the man who is thinking of buying a cheap car:

The difference between the Chalmers "Thirty-Six" and some other car you may be thinking of buying is probably about \$300 or \$400.

But the difference in value, we can honestly assure you, isn't less than \$1000.

Nowadays it is not merely enough that an automobile run. You can take that much for granted with almost any car. What you should look for is permanent satisfaction, comfort, good looks, elegance of equipment. You want a car you can be proud of. You want a car that will be good 5 or 6 or 8 years from now.

The Chalmers "Thirty-Six" is such a car.

Built in the Chalmers shops, manufactured—not assembled—made of the best materials and under the most rigid inspection, the "Thirty-Six" offers all you can ask in a motor car. If you are going to spend your money at all for a motor car, isn't it wise economy to put \$300 or \$400 more to it and make your first investment really good?

Please see the Chalmers "Thirty-Six" at our dealer's. An early order will insure prompt delivery.

—to the man who is thinking of buying a high priced car:

Just what more do you get in any high-priced car than you get in the Chalmers "Thirty-Six," at \$1950? Can you go any further in a day or a month? Can you go any faster (except at great risk)?

Can you ride with any greater comfort? Can you get any more conveniences to make driving easy and pleasant?

We honestly believe that many people choose high priced cars simply because they are high priced.

We know of many who have paid more than they really needed to pay—simply because they didn't realize that a medium priced car like the "Thirty-Six" would give maximum service.

We know these same people are paying out monthly far more in upkeep than they would need to pay for such a car as the "Thirty-Six."

To all such we say, "See the 'Thirty-Six'; ride in it; try it out thoroughly. It is a car you can be proud of—a car that will save you money—but not at the cost of satisfaction."

Chalmers Motor Company, Detroit

When Writing to Advertisers, Please Mention Motor Age.

KINGSTON

New Model Y Will Handle Grocery Store Gasoline

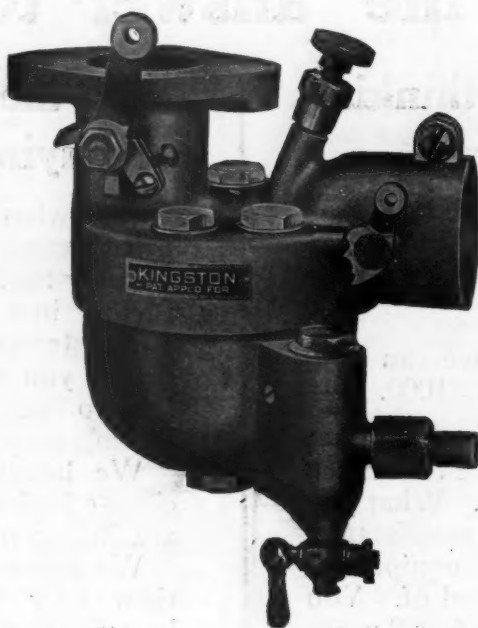
You can feed a KINGSTON New Model Y Carburetor any grade of fuel and it will draw all the power in it out of it

Specially Designed for Easy Starting

New Model Y will prime itself. Simply close a choke throttle, the air shuts off, and very strong suction, as the result of the vacuum created, is brought to bear on the spray nozzle. As a result, a very rich priming mixture is drawn to the motor. In addition to this feature a "well" around the spray nozzle supplies an automatic reserve for starting.

The contents of this "well" are exhausted in starting, thus insuring on the "pick up" none but a properly proportioned mixture.

Let us send you other reasons why your Carburetor should be a New Model Y KINGSTON. Write us.



Auxiliary Air Automatically Supplied

The auxiliary air supply — the hardest problem carburetor manufacturers have had to face—is automatically taken care of in the KINGSTON by 4 floating bronze ball valves. Each of these 4 balls opens under a different motor suction and supplies an absolutely uniform mixture for its given speed.

As the bronze balls cannot change their shape or weight, neither can they change in efficiency.

There are no air adjustments whatsoever with which to tinker.

Made by the Oldest Manufacturers of Carburetors in America
ESTABLISHED 1895

BYRNE, KINGSTON & COMPANY, Kokomo, Indiana

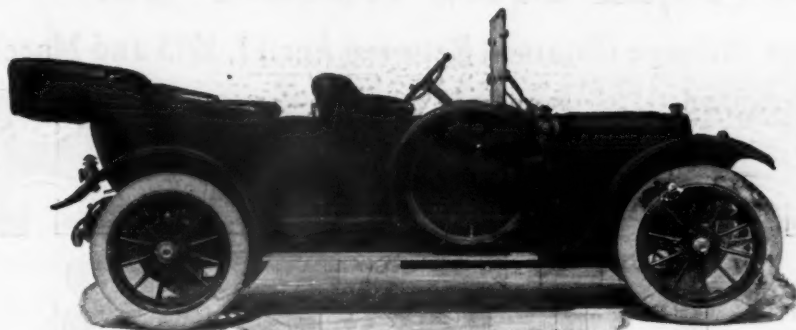
BRANCHES

CHICAGO1430 Michigan Av. NEW YORK.....1733 Broadway
DETROIT.....650 Woodward Av. LOS ANGELES.....804 So. Olive St.

When Writing to Advertisers, Please Mention Motor Age.

CASE FORTY

"The Car With the Famous Engine"



A Business Proposition

—One of Logic and Easy Understanding



The Sign of
Mechanical
Excellence
the World
Over

Our claim is that the Case "40" at \$2,200 is a car the duplicate of which cannot be found at a price within many hundreds of dollars of our price. And you say—"So is claimed for every car. I cannot turn a page but I am confronted with the startling announcement that of many cars built in America and Europe, this is the only one in which has been reached the pinnacle of perfection in motor design and construction. I turn the page, and again I see that, with the exception of a single car, 'all others are queer but thine and mine, and sometimes I think thine a little queer.'"

This holier-than-thou attitude has been characteristic of many manufacturers of automobiles. Extravagant claims have been made. Our reasoning, however, we believe is just a bit different. We simply say the Case Cars contain more for their prices than those of our competitors; and again, do you wonder why? Here is a brief outline why. (Our catalog tells more.) Because Case Cars are made by a company capitalized at \$40,000,000—a concern whose tremendous organization, developed during seventy-one years, enables us to manufacture at a minimum. We save where smaller companies must spend.

Automobiles were added to our output with practically negligible increase in distribution expense, because we had our tremendous sales force in the field, and thus we are saved a great share

of the costs of sales—items which figure so largely in the prices of cars made by smaller manufacturers. So again we save where others must spend.

HAVING THUS SAVED WHERE OTHERS MUST SPEND, WE CAN SPEND WHERE OTHERS MUST SAVE.

These savings have all gone into our cars, which are built to maintain our reputation, extending over a period of seventy odd years, as the manufacturers of thoroughly reliable machinery. Our reputation is your protection, our word your guarantee. Is not it reasonable? Do you not agree with us that our contention is logical?

May we not send you our catalog which describes in detail wherein we have saved and spent? A request to our Home Office or any one of our sixty-five branch houses and eleven thousand local dealers in the United States, Canada, South America, Mexico and Europe will bring this booklet, which we believe you will find of interest—that is, if you would invest wisely.

CASE FORTY

THE CAR WITH THE FAMOUS ENGINE

Westinghouse Electric Starter; Westinghouse Electric Lighting System for all Lamps; Side and Tail Lamps, Combination Oil and Electric; Warner Auto-Meter; Electric Horn; Rain Vision Ventilating Windshield; English Mohair Top, Side Curtains and Cover; 37x4½-inch Tires; Firestone Universal Quick-Detachable Demountable Rims; 124-inch Wheel Base; Three-Quarter Elliptic Springs; 4½x5½-inch Cylinders; Brown-Lipe Transmission; Timken Full Floating Axle; Rayfield Carburetor with Dash Adjustment; Bosch Magneto, Dual System Single Point Ignition. The usual Tools, Tire Repair Kit, Jack, etc. And in addition, Extra Tire and Tube on Rim, Extra Tube separate, Tire Cover, Tire Chains and Handy Work Light on long wire.

5-Passenger Touring, fully Equipped, \$2,200

J. I. Case T. M. Company, Inc., 605 Liberty St., Racine, Wisconsin

Case Cars are sold through 65 Branch Houses and 11,000 Dealers in United States, Canada, South America and Europe
(152)

\$5,000

In Cash Prizes Is Offered to Licensed Chauffeurs by the

Ajax-Grieb Rubber Co.

For the Greatest Mileage Obtained Between April 1, 1913 and March 31, 1914, on

AJAX TIRES

The following prizes to be distributed:

1 Prize	\$500	10 Prizes of \$50 each.....	\$ 500
1 Prize	300	40 Prizes of \$25 each.....	1,000
1 Prize	200	50 Prizes of \$20 each.....	1,000
5 Prizes of \$100 each.....	500	100 Prizes of \$10 each.....	1,000
208 Prizes, \$5,000			

In case of ties, prizes will be divided equally among tying contestants.

To the Chauffeur:

Every Ajax tire is guaranteed, in writing, for 5,000 miles. But 5,000 miles should be the minimum mileage, providing you give your tires the same care and attention you give to the mechanism of your car.

Guard against improper inflation, cuts, bruises, running in car tracks. Use the throttle more and the brakes less, and you'll save both tires and machine.

To the Car Owner:

Three-fourths of all tires come to an untimely end through lack of proper care.

It is to insure you against carelessness and to avoid abuse and neglect that prompts this offer.

Our compensation will come in the satisfaction which every Ajax tire will give, with an added reward in the continued patronage of the satisfied owner.

How to Enter:

It costs nothing to enter the Ajax Mileage Contest. The only requirements are, that your car be equipped with an Ajax tire (guaranteed for 5,000 miles) and that you will fill out a separate regulation entry blank for each individual Ajax tire, signed by your employer. Entry and final report blanks may be obtained at any Ajax Branch or Dealer. Enter now and take advantage of the full time allotted to the contest. Address Contest Department.

AJAX-GRIEB RUBBER COMPANY

Contest Department C

1796 Broadway, New York

AJAX BRANCHES

Brooklyn—1182 Bedford Avenue
Boston—15 Park Square
Philadelphia—316 No. Broad Street
Atlanta—48 Auburn Avenue
Dallas—1513 Jackson Street

Detroit—507 Woodward Avenue
Chicago—18th St. and Michigan Ave.
Cleveland—18th St. and Euclid Ave.
Kansas City—1606 Grand Avenue
Minneapolis—905 First Ave., South

Denver, Colo.—1518 Broadway
San Francisco—Golden Gate & Van Ness Aves.
Los Angeles—1229 So. Olive Street
Portland, Ore.—329 Ankeny Street
Seattle—917 East Pike Street

DEALERS IN PRINCIPAL CITIES

Samuel T. Freeman & Co., Auctioneers

1519-21 Chestnut Street, Philadelphia, Pa.

Receiver's Sale in Bankruptcy

Est. Louis J. Bergdoll Motor Co., Bkpt. No. 4742.

Stock Machinery and Fixtures of The Louis J. Bergdoll Motor Co.

S. W. Cor. 16th. and Callowhill Sts., Phil., Pa.

***Wednesday and Thursday, May 14th and
15th at 10 A. M. Each Day on the Premises***

The sale comprises the entire plant of the Louis J. Bergdoll Motor Co., including 8 automobiles, about 300 bodies, 40 motors, 225 frames, large stock of transmissions, carburetors, shafts, springs, sheet metal, radiators, running boards, lamps, rims and small miscellaneous parts, portable crane, electric air pump, beading and wiring machines, shears, punch, small tools, blue print machine, stock of paints, drying ovens, handsome quartered oak office furniture, adding machine, watchman's clock, etc., and the goodwill and name of the corporation. CATALOGUES AT THE AUCTION STORE.

By order of **FRANK A. HARRIGAN**, Receiver.

JOS. W. CATHARINE, Esq., Atty. for Receiver, Land Title Building.

Samuel T. Freeman & Co., Auctioneers

1519-21 Chestnut St., Philadelphia, Pa.

Regal

What Owners of Underslungs Say About Their Cars

THESE are the opinions of seven owners of Regal Underslung. They are statements from men who drive their own cars. Each man is quoted on some advantage of Underslung construction. Read what these men say about this type of construction and Regal cars.

A Government Official writes from Washington:—"I have just returned from a trip South in my Regal Underslung. Again I realize the great advantages of its construction. We were forced to drive through deep mud and water, yet came through without the slightest difficulty."

New York Newspaper Editor believes in Underslung construction:—"The principle of the Underslung appeals to nine out of ten motorists as being scientifically and mechanically correct. Personally, I will never own other than an Underslung."

A New Jersey College President expresses his satisfaction:—"I am so well satisfied with my Regal Underslung touring car that I wish to tell you of my recent trip. * * * Your cars have the staying qualities, I am satisfied."

This Illinois Business man says his next car will be another Regal:—"Since November thirteenth my car has been on the go from 4 A.

M. until 11 P. M. daily. Soon we shall need another car and it will be another Regal Underslung."

This Nashville Physician has driven 20,000 miles in 2 years; he writes:—"My car has assisted me in my practice every day since the summer of 1911, traveling 20,000 miles. The motor is as good today as when I bought the car."

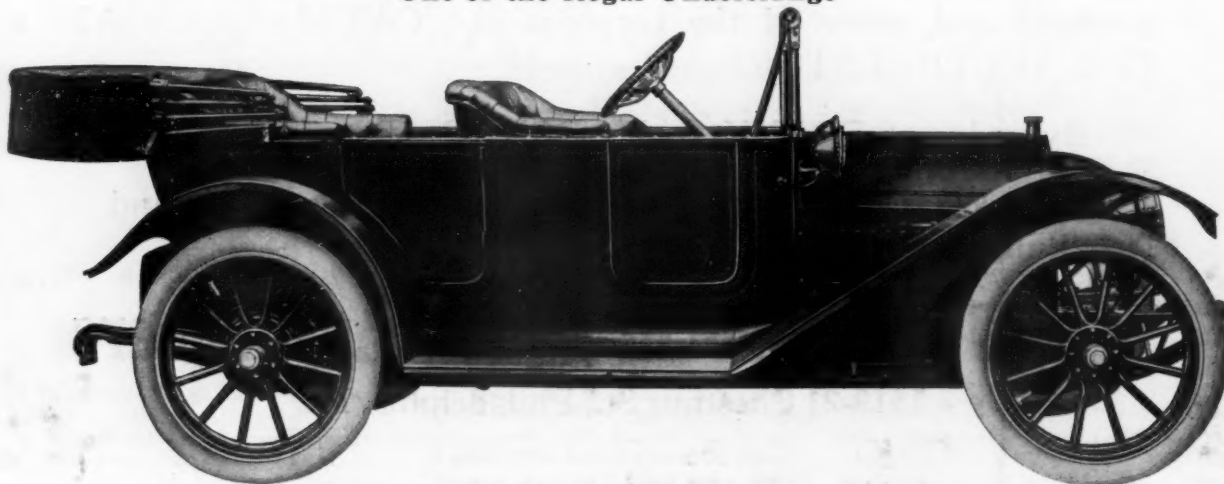
This Iowa Contractor finds his car a great hill climber:—"I never had the pleasure of driving a car I liked better than my Regal Underslung. It climbs any hill and recently ascended a 50% plank runway erected in this city."

A Michigan Business man tests for Gasoline and Oil consumption:—"I proved that my Regal Underslung is an economical car by driving it 50 miles over country roads on two gallons of gasoline and two-thirds of a pint of lubricating oil."

These are a few of our many expressions of faith in Underslung construction. In making your selection of an automobile you should read the Regal treatise on Underslung design. It's an attractive pamphlet worth owning. Write today. Ask for booklet "D".

The Regal Motor Car Company, Detroit

One of the Regal Underslung



\$950—The Regal Model "T" Underslung Touring Car—\$950

When Writing to Advertisers, Please Mention Motor Age.



TIMES SQUARE AUTO CO.



AMERICA'S AUTOMOBILE CLEARING HOUSE

NEW HOME THE HEART OF AUTOMOBILE ROW **S. W. Cor. 56th Street and Broadway**

World's Largest Dealers in New and Used Automobiles and Accessories. Anything and Everything for the Automobile

SEND FOR "OUR PRICE WRECKER"
OVER TWENTY THOUSAND SATISFIED CUSTOMERS

SPECIAL DEALERS' PRICES

NEW CARS Consists of the surplus stocks bought for spot cash from a number of leading makers, the names of whom, by agreement, we cannot publicly advertise by reason of these cut prices. They will be given, together with full particulars, to any one inquiring by letter or in person. We have now on our sales floors:

ALL CARS GUARANTEED

Regal Overslung 40 H.P. 7 Pass. Fore-Door Touring. Equipped generator, head, side and tail lamps, horn, etc.....	Reg. Price \$1,750	Our Price \$885
Regal Overslung 30 H.P. 5 Pass. (also limited number 4 Pa. s.) Fore-Door Touring. Equipped generator, head, side and tail lamps, horn, etc.....	Reg. Price \$1,250	Our Price \$685
Top, windshield and speedometer extra..		\$ 65
25-H.P. RUNABOUTS, NEW, 1912.....	\$ 780	\$495
30-H.P. RUNABOUTS, NEW, 1912.....	\$1,375	\$875
35-H.P. RUNABOUTS, NEW, 1913.....	\$1,575	\$875

TRUCKS Having purchased for spot cash the entire stock of the Alden Sampson Mfg. Co., of Detroit, Mich., we are thus enabled to make this unparalleled slash in prices. **Guaranteed New Sampson Trucks.**

Reg. Price	Our Price	Reg. Price	Our Price
1½-ton.....\$2,000	\$1,300	3-ton.....\$3,400	\$1,950
2-ton.....\$2,800	\$1,400	4-ton.....\$4,250	\$2,250
5-ton.....			\$4,750

USED CARS For years recognized as the largest dealers in used cars. **OVER 500 Second-hand Cars on Exhibit. Our price..\$250 up**

Guaranteed Inner Tubes

	Regular Price		Dealer's Price	
	Gray	Red	Gray	Red
28x3.....	\$3.05	\$3.50	\$2.25	\$2.50
30x3.....	\$3.20	\$3.65	\$2.40	\$2.70
30x3½.....	\$4.30	\$4.90	\$3.35	\$3.50
32x3½.....	\$4.50	\$5.15	\$3.45	\$3.60
32x4.....	\$5.90	\$6.70	\$4.25	\$4.45
34x3½.....	\$4.85	\$5.50	\$3.60	\$3.85
34x4.....	\$6.20	\$7.05	\$4.50	\$4.70
36x4.....	\$6.60	\$7.50	\$4.60	\$4.80

Send for Complete List

BODIES



Our Body Department contains the largest assortment of two and fore-door bodies in America. Every size and style of 2, 4, 5, 6 and 7-passenger, open and closed. Wide, roomy, well finished, high grade.

SPECIAL—5-PASS., FORE-DOOR BODY, all sizes, to fit any car, upholstered in best quality leather, painted, ready for mounting..... **Reg. Price \$300 Our Price \$85**
TOP COMPLETE, fitted to body with side curtains..... **EXTRA, \$25 \$650 \$350**
LIMOUSINE.....
COUPE, INSIDE DRIVE, 2-3-4-5
PASS. BODY.....\$800 to \$1500 **\$250 to \$400**

TOPS always in stock. The largest and most complete line of high-grade tops.



	Reg. Price	Our Price		Reg. Price	Our Price
5-PASS. TOURING TOP, complete...	\$75	\$25	RUNABOUT, all sizes, complete..	\$50	\$15
4-PASS. TOURING TOP, complete...	\$60	\$18	TOP COVERS, all sizes.....	\$10	\$2.50
			CUSHIONS, all sizes.....	\$15	\$3.00 up
			RUMBLE SEATS, each...	\$15	\$7.50 up

TIRES We are the largest jobbers in Tubes and Tires. **Guaranteed Standard Makes at Cut Prices.** Always carry a large stock, all styles of "factory seconds" and shop soiled tires. Do not be deceived and pay for a guarantee that means nothing but trouble.

All Fresh Goods—Complete prices furnished on request. Following are a few special bargains:

Reg. Price	Our Price	Reg. Price	Our Price
28x3.....\$12.60	\$ 7.50	34x3½.....\$23.05	\$15.00
30x3.....\$13.50	\$ 8.25	34x4.....\$31.30	\$17.50
30x3½.....\$19.25	\$10.00	32x4.....\$29.25	\$16.50
32x3½.....\$21.10	\$12.50	Other sizes in proportion.	

OUR PRICE—Always about 50% from the REGULAR PRICE.

BLOW-OUT PATCHES—Rubber, Rawhide and Chrome Leather; All Sizes; Each.....\$1.50 40c
SOLID RUBBER TIRES, ALL SIZES, AT GREATLY REDUCED PRICES. SEND FOR SPECIAL TIRE LIST.

Reg. Price	Our Price
TIRE HOLDERS (Japanned Finish).....	\$3.50 \$0.85..
RIMS—Dorian demountable; each.....	\$5.75 \$3.50
FOOT PUMPS.....	\$3.50 \$1.25

Thousands of other sundries always on hand. No matter what you want in accessories, we have it and you save money.

Remember, all accessories purchased from us can be returned intact within a week and money will be refunded.

Advise us of your needs and we will send special quotations.



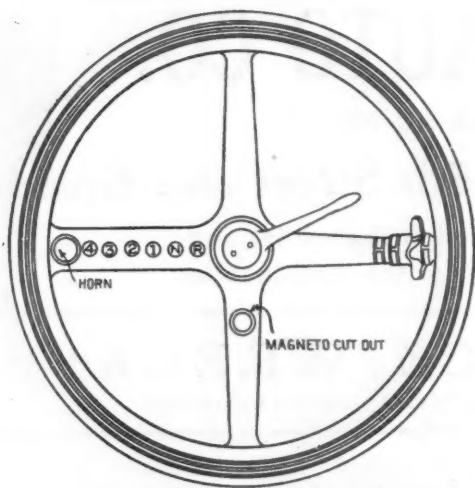
TIMES SQUARE AUTO CO.

NEW YORK
S.W. Cor. Broadway & 56th St.

Get the habit of dealing with us and save money

CHICAGO
1210-12 Michigan Avenue





The **SGV** **VULCAN** **ELECTRIC** **Gear Shift**

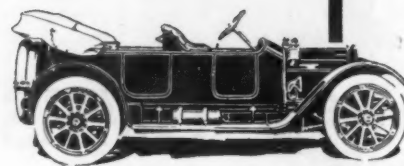
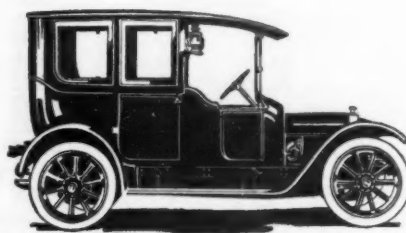
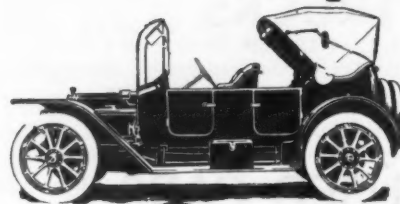
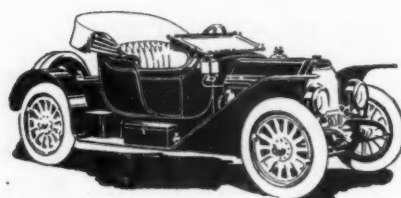
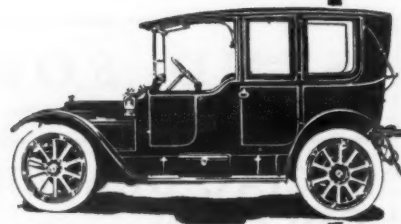
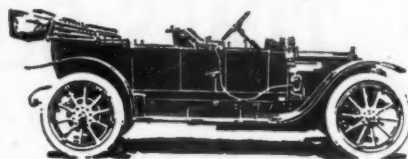
is the longest step yet made in utilizing the surplus energy of the gasoline motor.

The same accumulator battery charged by a fly wheel magneto, that lights and starts the car, is used to shift the gears. As easy to drive as any electric—without the electric's limitations.

The little car with the big car's quality and its own refinements.

A few desirable agency territories still open

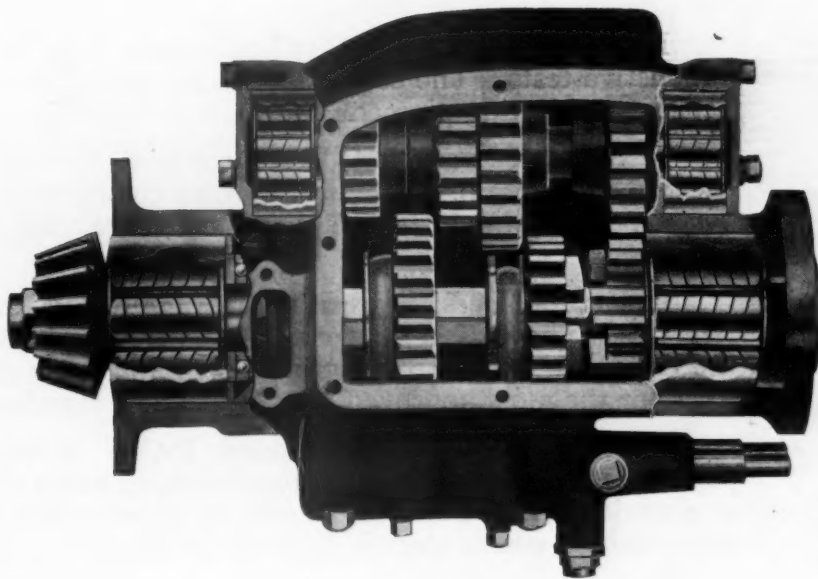
THE SGV CO.
READING, PA.



When Writing to Advertisers, Please Mention Motor Age



HYATT QUIET BEARINGS



HYATT HIGH DUTY TYPE BEARINGS are best for transmissions because:—They have never failed in Transmission service. Once adopted for use in transmissions, they have never been replaced by any other make; they have, in many instances, replaced other bearings. They reduce noise. They possess superior lubricating qualities found in no other bearings. Their cushioning effect relieves gears and shafts of undue strains, reducing excessive and unnecessary wear.

High efficiency, first cost, dependability—each and all of which make bearing value, are not claimed as exclusive Hyatt features—but in practical value—the proper proportioning of all these factors and in ability to enable the Motor Car Builder to meet present conditions—the Hyatt Roller Bearing is claimed superior.

HYATT ROLLER BEARING CO.
DETROIT, MICHIGAN

WORKS, NEWARK, NEW JERSEY

When Writing to Advertisers, Please Mention Motor Age.

R=C=H**"Twenty-Five"****Completely
Equipped****\$900****F. O. B. Detroit****THE CAR**

Wheelbase—110 inches.

Motor—Long-stroke, four cylinders cast en bloc; 3¼-inch bore, 5-inch stroke. Two-bearing crankshaft. Timing gears and valves enclosed. Three-point suspension.

Steering—Left Side. Irreversible worm gear, 16-inch steering wheel. Throttle control on steering column.

Control—Center Lever operated through H-plate integral with universal joint housing just below. Hand lever emergency brake at driver's right. Foot accelerator in connection with hand throttle.

Springs—Front, semi-elliptic; rear, full elliptic and mounted on swivel seats.

Frame—Pressed steel channel.

Axles—Front, I-beam, drop forged; rear, semi-floating type.

Transmission—Three speeds forward and reverse; sliding gear; selective type.

Construction—Drop-forgings wherever practicable; chrome nickel steel used throughout all shafts and gears in the transmission and rear axle; high carbon manganese steel in all parts requiring special stiffness.

Bodies—Touring car; full five-passenger English type; extra wide seats. Roadster, two-passenger, English type.

Color—Option dark Russian green or R-C-H red without extra charge.

THE EQUIPMENT

Lighting: Option of gas headlights with oil side and tail lamps, or all-electric system with five latest type, powerful lamps; high-grade in every detail; tires, 32 x 3½-inch all-around; Bosch high tension magneto; high grade speedometer; demountable rims; extra rim and holders; "Tally-ho" horn; "Jiffy" curtains; top and top cover; windshield; tool kit; jack; tire pump; tire repair outfit; robe rail. With the Roadster a 25-gallon gasoline tank, with baggage trunk large enough to carry two suit cases, is mounted on the rear deck; tire holder is also furnished.

TWO COLOR OPTION AT NO ADDED COST

THE R-C-H "Twenty-Five" is now offered with the option of two beautiful body finishes without extra charge and without shipping delay. Cars may be secured in the new Russian green or in the famous R-C-H red. This color option is the newest innovation in the popular priced car field.

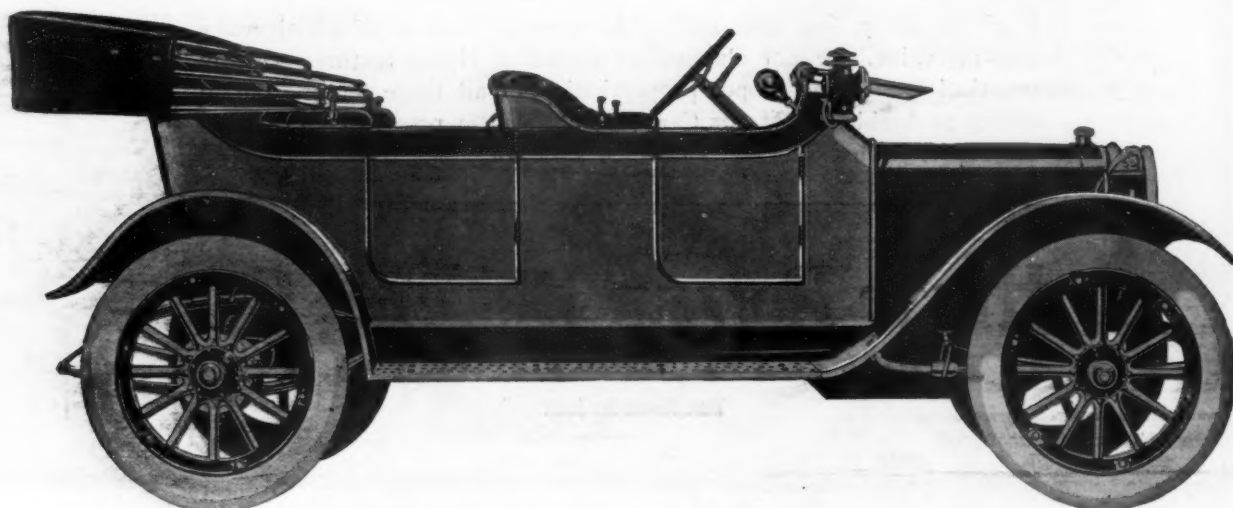
Both R-C-H "Twenty-Five" color selections have been made after exhaustive tests. The colors chosen as standard require the most expensive and lasting pigment known to automobile body finishers.

Russian green and R-C-H red contain generous quantities of lead; they do not contain, like blue and other colors, aniline mixtures which weaken the primary colors and, therefore, the resistance to the elements.

In Europe, Russian green is the rage. It is the coming color in America. The R-C-H "Twenty-Five," the leader in the adoption of the European long stroke motor and roomy body design, is now first to adopt the most approved body finish as a standard color.

Another step in the continued R-C-H determination to fulfill popular requirements is the option, without extra charge, of either gas or electric lights. This feature will be appreciated at once by those in communities where electric lighting is not practicable.

Write us today about this newest, biggest and best opportunity ever presented by the R-C-H Corporation or any other manufacturers.

R-C-H Corporation**101 Lycaste Street,****Detroit, Michigan****Represented by Branches and Distributors in all Leading Cities of the World.***When Writing to Advertisers, Please Mention Motor Age.*

Correct automobile lubrication is a serious problem. But its fundamentals are simple. We will cover them in a plain question-and-answer form.

Question: What moves any car?

Answer: Power.

Question: What determines the power?

Answer: The motor, the fuel and the lubricant. If any one of these factors falls short in full efficiency, the motorist receives less than full power. The greater part of the power lost is taken up by friction—wear on the moving parts.

Question: What will give the most efficient lubrication?

Answer: An oil of the highest lubricating qualities whose "body," or thickness, is best suited to the feed requirements of the motor.

Question: Suppose the motorist uses oil of lower lubricating quality or of less correct "body." What are the penalties?

Answer: Many. Among them are:

(1) Escape of the explosion past the piston rings. (2) Unlubricated cylinder

walls at the upper end of the piston stroke. (3) Imperfect lubrication of many of the bearings. (4) Excess carbon deposit. (Due to the oil working too freely past the piston rings and burning in the combustion chamber.) (5) Excessive oil and fuel consumption. (6) Worn wrist pins. (7) Rapid and unnecessary deterioration of the motor. (8) Loose bearings. (9) Noisy operation.

Question: How can the motorist determine the correct oil for his car?

Answer: By consulting the lubricating chart—printed in part on the right.

Question: What assures the reliability of this chart?

Answer: The chart is the result of the most far-reaching

and most thorough study of automobile lubrication that has ever been undertaken.

It was prepared by a Company whose authority on scientific lubrication is recognized throughout the world—the Vacuum Oil Company.

It was prepared after a careful analysis of the motor of each make and each model of American and foreign car.


The superior efficiency of the oils specified has been thoroughly proven by practical tests.

If the motorist uses oil of lower lubricating quality or of less correct "body" than that specified for his car, the motor faces unnecessary friction, loss of power, and ultimate serious damage.

A booklet, containing our complete lubricating chart, together with points on lubrication, will be mailed on request.

The various grades, refined and filtered to remove free carbon are: Gargoyle Mobiloil "A", Gargoyle Mobiloil "B", Gargoyle Mobiloil "D", Gargoyle Mobiloil "E", Gargoyle Mobiloil "Artic"

They are put up in 1 and 5 gallon sealed cans, in half-barrels and barrels. All are branded with the Gargoyle, which is our mark of manufacture.

GARGOYLE

Mobiloil
A grade for each type of motor

VACUUM OIL CO., Rochester, U. S. A.

BRANCHES:

NEW YORK BOSTON PHILADELPHIA DETROIT INDIANAPOLIS CHICAGO
29 Broadway 49 Federal St. 4th & Chestnut Sts. Ford Bldg. Indiana Pyth. Bldg. Fisher Bldg.

Distributing Warehouses in the principal cities of the world

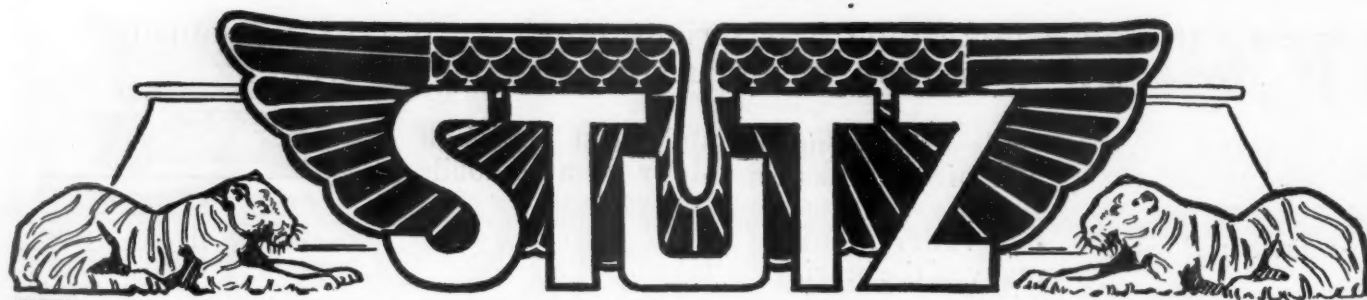
The above advertisement appears in the Saturday Evening Post, Collier's, Literary Digest, Life, Scientific American. Other advertisements will appear in Leslie's Weekly, Cosmopolitan, Munsey's, Review of Reviews, World's Work, Century, Harper's, System, Everybody's, McClure's, Outing.

When Writing to Advertisers, Please Mention Motor Age.



Explanation: In the schedule, the letter opposite the car indicates the grade of Gargoyle Mobiloil that should be used. For example: "A" means "Gargoyle Mobiloil A." "Arc" means "Gargoyle Mobiloil Arc." For all electric vehicles use Gargoyle Mobiloil A. The recommendations cover both pleasure and commercial vehicles unless otherwise noted.

MODEL OF CARS	1909	1910	1911	1912	1913
Abbott Detroit	A	Arc	Arc	Arc	Arc
Alco	A	Arc	Arc	Arc	Arc
American	A	Arc	Arc	Arc	Arc
Apperson	A	Arc	Arc	Arc	Arc
Autocar (4 cyl.)	A	A	A	A	A
Avery	A	A	A	A	A
Buick (2 cyl.)	A	A	A	A	A
Buick (4 cyl.)	A	Arc	Arc	Arc	Arc
Cadillac (4 cyl.)	B	A	A	A	A
Carter	A	A	A	A	A
Caterpillar	A	A	A	A	A
Case	A	A	A	A	A
Chalmers	Arc	Arc	Arc	Arc	Arc
Chase	B	B	B	B	B
Cole	A	A	A	A	A
Columbia	A	E	E	A	A
"Knight"	A	A	A	A	A
Coupe Gear	A	A	A	A	A
Daimler	A	A	A	A	A
"Knight"	A	A	A	A	A
Darracq	A	A	A	A	A
De Dion	B	B	B	B	B
Delamag-Bellville	B	A	A	A	A
Elmore	A	A	A	A	A
E. M. P.	Arc	Arc	Arc	Arc	Arc
Flat	B	A	A	A	A
Flanders	E	E	E	Arc	Arc
"(6 cyl.)"	E	E	A	E	E
Ford	E	E	A	E	E
Franklin	B	B	Arc	A	A
"Com'l."	B	A	B	A	A
G. M. C.	A	A	A	A	A
Gramm	A	A	A	A	A
Graton-Logan	A	Arc	Arc	A	A
Herreshoff	A	A	A	A	A
Hewitt (2 cyl.)	A	A	A	A	A
Hewitt (4 cyl.)	A	A	A	A	A
Hudson	Arc	Arc	Arc	Arc	Arc
Hupmobile "20"	Arc	Arc	Arc	Arc	Arc
Hupmobile "30"	Arc	Arc	Arc	Arc	Arc
I. H. C. (4 cyl.)	A	A	A	A	A
"(6 cyl.)"	A	A	A	A	A
International	B	A	B	B	B
Interstate	A	A	A	A	A
Isotta	A	A	A	A	A
Italy	A	A	A	A	A
Jackson	A	A	A	A	A
"(4 cyl.)"	A	E	A	Arc	A
Kelly	A	A	A	A	A
Kelly Springfield	A	A	A	A	A
Kissel-Kar	A	E	A	A	A
"Com'l."	A	A	A	A	A
Kline-Kar	Arc	Arc	Arc	Arc	Arc
Konn	B	A	B	A	B
Krit	B	A	B	A	B
Lancia	B	A	B	A	B
Loomobile	Arc	Arc	Arc	Arc	Arc
Lucas	A	A	A	A	A
Mack	A	E	A	E	E
Marion	Arc	Arc	A	A	A
Marmon	Arc	Arc	A	A	A
Matheson	Arc	Arc	A	A	A
Maxwell (2 cyl.)	E	E	E	Arc	Arc
Maxwell (4 cyl.)	E	E	E	Arc	Arc
"(6 cyl.)"	E	E	E	Arc	Arc
Mercedes	A	E	A	E	A
"Knight"	A	A	A	A	A
Merz	A	A	A	A	A
Michigan	A	A	A	A	A
Minerva "Knight"	A	A	A	A	A
Mitchell	A	A	A	A	A
Moon	A	E	A	E	E
National	A	A	A	A	A
Oakland	A	A	A	A	A
Oldsmobile	A	E	A	E	E
Overland	A	E	A	E	E
Packard	Arc	Arc	Arc	Arc	Arc
Paige Detroit	A	E	A	E	A
Paillard	A	E	A	E	A
Pathfinder	A	A	A	A	A
Pearson	Arc	Arc	Arc	Arc	Arc
Pierce Arrow	A	Arc	Arc	A	A
"Com'l."	A	E	A	E	A
Pope Hartford	A	A	A	A	A
Premier	A	A	A	A	A
Pullman	A	E	A	E	E
Rambler	A	A	A	A	A
Rapid	A	A	A	A	A
Rayfield	A	A	A	A	A
Rex	A	E	A	E	E
Renault	A	A	A	A	A
Rex	A	E	A	E	E
S. O. V.	A	E	A	E	E
Selden	A	E	A	E	E
Simplex	Arc	Arc	Arc	Arc	Arc
Speedwell	A	Arc	Arc	A	A
"Mead"	D	D	D	D	D
Stanley	D	D	D	D	D
Stearns	A	A	A	A	A
Stevens Duryea	Arc	Arc	Arc	Arc	Arc
Stoddard-Dayton	E	E	Arc	A	A
"Knight"	A	A	A	A	A
Studebaker	A	E	E	A	A
Stutz	A	E	E	A	A
Thomas	E	E	E	E	E
Waller	A	E	E	Arc	Arc
Warren Detroit	A	E	A	E	E
White (Gas)	Arc	Arc	Arc	Arc	Arc
"(Steam)"	D	D	D	D	D
Whitcomb	E	E	Arc	Arc	Arc



The Stutz Is Quality Built

EVERY STUTZ car is built with as much care and pains as the costliest watch. Every ounce of material—every detail of workmanship that goes into the STUTZ is absolutely the best.

There are so many satisfied STUTZ owners throughout the country that we are not spending a nickel for national magazine advertising—we have demands for more cars than we can produce under our careful painstaking system without it. We are putting that cost into STUTZ QUALITY.

We are building less than 1,000 cars—we have demands for three times that many.

If we built more cars we could not give the attention to the many details—such as are easily slighted in a great organization burdened with quantity production.

We could not build in quantities without sacrificing the QUALITY, and we would not sacrifice the QUALITY of one STUTZ car for the greatest quantity production in the industry. We would far rather be known as QUALITY producers.

There is no watered stock; no costly branches to maintain, in the STUTZ organization.

Every nickel of STUTZ purchase price is given back to the user in STUTZ QUALITY.

These are the reasons for the superior quality of STUTZ cars—the reasons why the STUTZ gives genuine service—the reasons why every STUTZ owner is proud of his car no matter in what company he associates.

Stutz Features

Full electric light equipment with dependable generator and storage battery.

Stutz special rear system.
Timken front axle.

Gemmer "A" grade steering gear.
Force feed oiling system through hollow crank shaft.
Over-size tires.
Water-jacketed intake manifold.

Black and nickel trimmings throughout.
4 $\frac{1}{4}$ x5 T-head motor in six-cylinder models.
4 $\frac{3}{4}$ x5 $\frac{1}{2}$ T-head motor in four-cylinder models.

Stutz Models

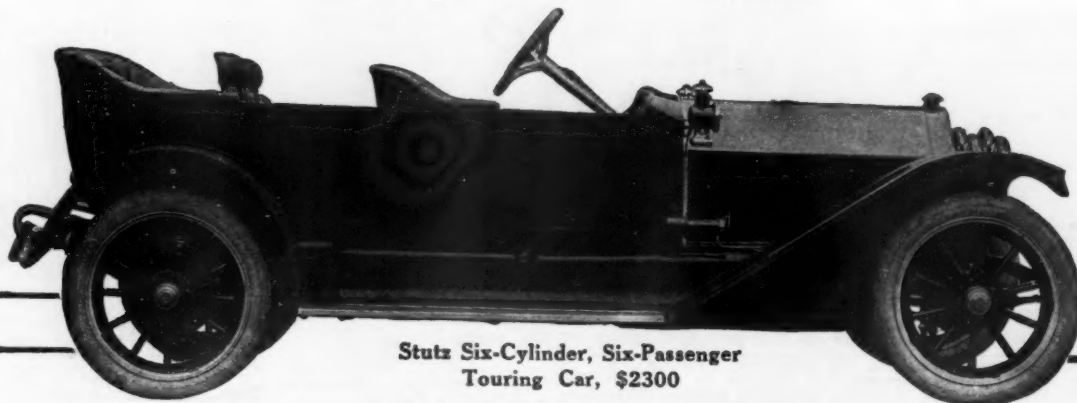
STUTZ cars are made in five models

Six-cylinder, six-passenger touring car.....	\$2300
Six-cylinder roadster.....	2250
Four-cylinder, six-passenger touring car.....	2050
Four-cylinder, four-passenger touring car.....	2000
Four-cylinder roadster.....	2000

Write today for advance Booklet A-2
Sturdy Stutz Announcement, Series B.

The Ideal Motor Car Company

Manufacturers of Stutz Cars
Indianapolis, Indiana



Stutz Six-Cylinder, Six-Passenger
Touring Car, \$2300

When Writing to Advertisers, Please Mention Motor Age.

BRING YOUR OLD CAR UP TO DATE BY INSTALLING A



Electric Headlight Outfit 40

Complete Outfit—Electric Generator, Headlamps, Switch Wire and Bulbs

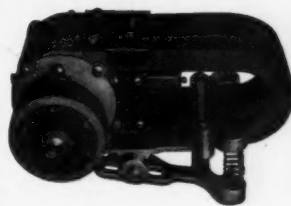


HEAD LAMPS

are handsome and made from one piece drawn from steel dies, have no soldered joints and are easy to polish. No extra charge for black finish. The Reflectors are set in the door against a felt ring to keep out dust and moisture. They are made of correctly formed brass, heavily silvered and highly polished on the reflecting surface. Lamps alone, \$15 and \$17.

GENERATOR

embodies the well-known K-W construction, having no commutator, brushes or sliding contacts, the only moving part being the rotor, which swings free, supported on high duty ball bearings. Generator weighs but 18 lbs. Compare it with the heavy, complicated and costly charging outfits. If you have Electric Head Lamps get the K-W Electric Generator, only \$25. Can be used for ignition in connection with timer and spark coil.



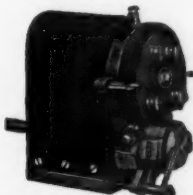
EASY TO INSTALL on any car having exposed flywheel or other place to belt or friction drive the generator.

The K-W High Tension Magneto

For all cars having provision for Magneto

High Tension Magneto are for Ignition only. Use Low Tension for Lights. If you cannot gear-drive a High-Tension Magneto, use one of our Low Tension belt or friction-drive Magnetos and a K-W Spark Coil. Write for details.

Model J
Guaranteed
to Start
Auto
Engines up
to 30 H. P.



No Coil
No Timer
No Batteries
4 Cyl., \$50
6 Cyl., \$55

We make larger Magnetos for larger engines.

K-W FORD ELECTRIC HEADLIGHT OUTFIT, \$15

FOR CARS WITH FLYWHEEL MAGNETO

The successor to the gas tank. The most successful electric headlight outfit for Ford cars, because it is especially designed and engineered to work in connection with the Ford Flywheel Magneto.

Send for descriptive folder

Why the K-W Master Vibrator?

Because It Will Positively Give You



A Hotter Spark
A Smoother Running Engine
Easier Starting

More Power
Less Carbon Deposits
Cleaner Spark Plugs

Over 38000 Ford Owners Have Installed Them

And more are doing so every day. Watch the number grow monthly. OUR GUARANTEE: Try the K-W Master Vibrator for 30 days and if you can get along without it return it and we will send your money back and ask no questions. Send for descriptive folder.

Get **K-W** and That **SATISFIED FEELING**

Price \$15

WE PREPAY THE EXPRESS all the way on the K-W Master Vibrator and East of the Mississippi on all our other goods when cash accompanies the order.



TRADE MARK
THE K-W IGNITION CO.
CLEVELAND, OHIO, U.S.A.

Be sure to give street number

→ 2835 Chester Ave.

Agents in all Principal Cities: New York, E. J. Edmond, 1788 Broadway; Boston, Walter J. Forbes, 243 Columbus Ave.

This Advertisement Written For Salesmen Only!

If you are selling automobile accessories or supplies of any kind, **anywhere**, and are making less than Eighty Dollars per week we want to hear from you.

We need salesmen in seventy-three different territories. The men we need are men who know something about the automobile business, men with enough executive ability to handle other salesmen and men who are **wide-awake**.

If you are the kind of man we need this is your opportunity. Once and for all it assures you of future independence by establishing you in a business practically your own. At the same time it assures you of a large increase over your present income. Any salesman who cannot double his present income by taking up our work has no right in this world to call himself a salesman.

Up to date we have taken on some two dozen men. No one of them is earning less than eighty dollars per week.

Some few of them are earning three times that amount, for **they are the kind of men we are looking for**.

We make **"THE ONLY AUTOMOBILE ACCESSORY OF ITS KIND IN THE WORLD."**

You have seen our advertisements and will continue to see them.

If you **ARE A GOOD SALESMAN** and are looking for more money we want to hear from you. Your territory may be the next that we close up. Better write now, for we consider all applications in the order received. **Get yours in first.**

The Ohio Top & Manufacturing Company

Makers of the Ohio Top Hoist



Toledo, Ohio



The charm of a fine appearing car
The delight in a perfectly developed six
cylinder motor
The satisfaction of a car nicely attuned
in every unit

These are attributes that generally speaking may
apply to many cars, but regarding no two makes do
they have the same significance. - - - - -

You may find cars which measure close to the Speedwell as far as the prevailing specification listings are concerned but if you could compare the size and strength of every frame member, the quality of the steels used, the grade and kind and number of bearings employed, the nicety of designing details, then you would begin to appreciate the real worth of the Speedwell "Six."

Concerning which we are warranted in saying you'll not find in the entire list of motor cars a "Six" that combines so many wanted features as this sixty horse power Speedwell "Six," selling at anywhere around its price—four and five passenger touring models at \$2850—seven passenger models at \$2950.

The Speedwell Motor Car Co.
DAYTON, OHIO

Making the Dull Season Pay

FOR the average motor car dealer half the year is "dead," so far as sales go, while the overhead expenses and fixed charges cut deep into the profits of the selling season.



MOTOR TRUCKS

1500 Lb. Delivery Wagon

2-Ton Truck

Will change this condition in your business. Added to your present line of pleasure cars, they will give you a YEAR ROUND business, eliminate the slack season, and make your dull months the livest and most profitable in the year.

Eight years of continuous success proves the **rightness** of the Dorris.

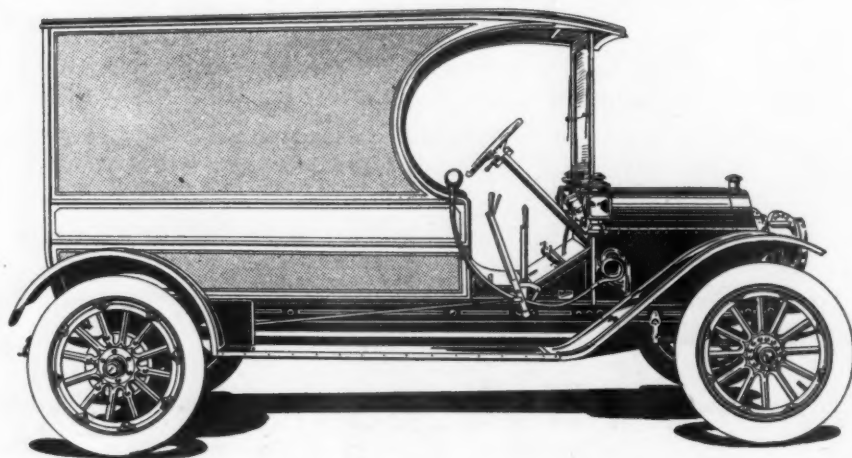
The experience of Dorris users, including hundreds of representative concerns in nearly every line of business, prove its adaptability and efficiency.

And its distinctive advantages of construction—exclusive Dorris Automatic Governor which enables the **owner** to control the speed of the car; Dorris type Speedometer Drive direct from propeller shaft; the excessively powerful silent Dorris Motor with improved Dorris Valve action; extreme simplicity, etc.—are selling points that sell.

Let us tell you more about how Dorris Trucks may **double** your sales and profits without **any** increase in your present investment or overhead and selling expenses.

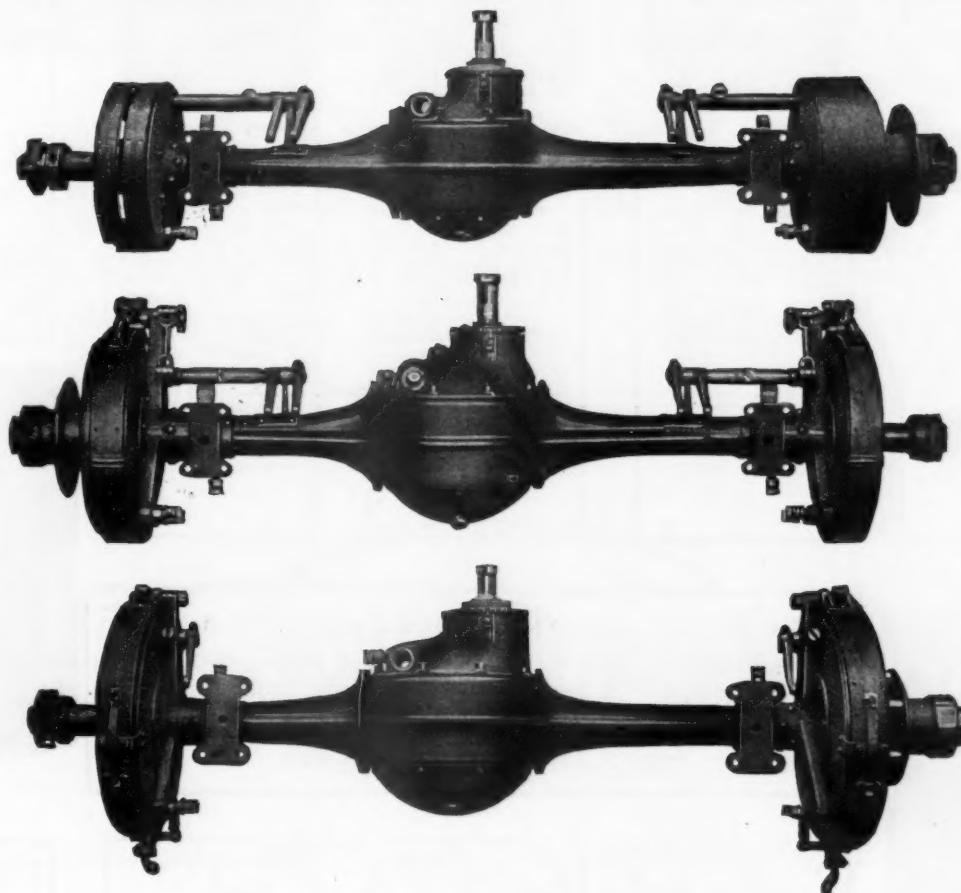
Write today for our proposition.

DORRIS MOTOR CAR CO., 100 S. Sarah St., St. Louis, U. S. A.



When Writing to Advertisers, Please Mention Motor Age.

American Axles



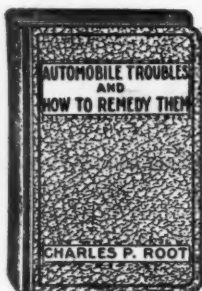
Bevel Drive Type

American Axles of the full-floating, bevel drive type, are made in three sizes, thus exactly meeting the requirements of light, medium and heavy motor cars of the highest grade.

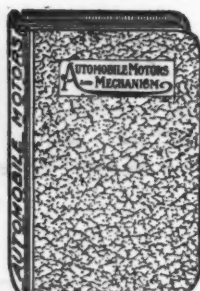
The superior class of a car fitted with *American Axles* may be safely taken for granted. The quality of these axles, depending as it does upon perfection of design, of materials and of workmanship, necessarily restricts them to cars embodying in all other respects these desirable characteristics.

This literally holds true for both gasoline and electric cars fitted with *American*, and accounts in a large degree for their easy transmission of power and economy of maintenance. It's just one more proof of the wisdom of buying the best.

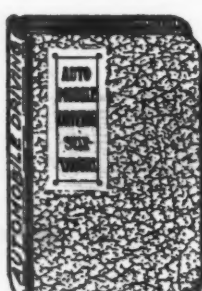
The American Ball-Bearing Co., Cleveland, Ohio.



AUTOMOBILE TROUBLES AND HOW TO REMEDY THEM. By Charles P. Root, former editor "Motor Age." Pocket size: 5x7 inches, 252 pages, illustrated, handsomely bound in red flexible leather, round corners, red edges. The only book of its kind published. It not only tells you how to locate troubles and make repairs, but shows you. Price, flexible leather, \$1.50.



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AUTOMOBILE DRIVING SELF-TAUGHT. By Thomas H. Russell, M.E., LL.B. An exhaustive treatise on the Management, Care and Operation of Motor Cars. Pocket size, 230 pages, liberally illustrated, handsomely bound in black seal flexible leather, round corners, red edges. Price, flexible leather, \$1.50.



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SELF-PROPELLED VEHICLES. By James E. Homans, A.M. A practical treatise on the theory, construction, operation, care and management of all forms of automobiles, with upwards of 500 illustrations and diagrams, giving the essential details of construction and many important points on the successful operation of the various types of motor carriages driven by steam, gasoline and electricity. This is probably the best comprehensive treatise published in simple language, so that the contents may be readily understood by the intelligent reader. It is an excellent work to begin with before going deeper into the subject. Size, 5 1/4 by 8 1/4. Pages, 652. With Drawings and Half-Tones. Cloth \$2.



TEN BOOKS that cover the entire automobile field are here offered at from 25 cents to \$2 per copy. Any book mailed postpaid on receipt of price. Order from

THE CLASS JOURNAL COMPANY

910 S. Michigan Avenue, CHICAGO

PRACTICAL GAS ENGINEER. By E. W. Longnecker. Twelve years' constant experience with Hydro-Carbon Engines. How to start, how to operate, and how to care for all classes of explosive motors or engines using gas, gasoline or similar fuels. A full and exhaustive chapter on electric and other systems of igniting. Every line tells something. Every page full of interest. A book of 172 pages, neatly bound in cloth. Sent postpaid on receipt of price, \$1.00.

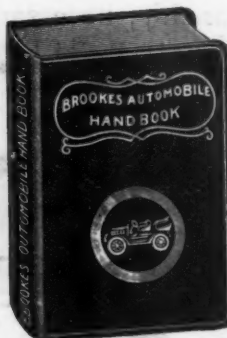
DRY BATTERIES. How to Make and Use Them. By a Dry Battery Expert. With additional notes and 30 original illustrations by Norman H. Schneider. Size, 4 1/4 x 7 1/4. Pages, 59. With drawings. Paper covers, 25 cents.



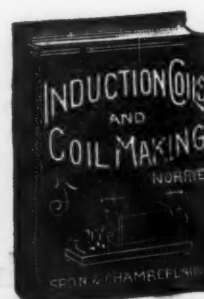
SMALL ACCUMULATORS. How Made and How Used. By P. Marshall. An elementary handbook for students and beginners, discussing theory and practice in the construction of small storage batteries, with instructions for charging and using batteries. Size, 4 1/4 x 6 1/2. Pages, 80. With illustrations. Cloth boards, 50 cents.



THE AUTOMOBILE HANDBOOK. By L. Elliott Brookes. 700 pages and over 320 illustrations. New enlarged edition. Popular edition, full leather limp, \$2.00 postpaid. A work of practical information for the use of Owners, Operators and Automobile Mechanics.



INDUCTION COILS AND COIL MAKING. By H. S. Norrie. A practical work on how to make, use and repair coils, which includes some consideration of coils for automobiles. The subject is treated as a whole, however, and it is from this standpoint rather than detailed discussion of types that it is useful to the autoist. Size, 4 1/4 x 6 1/4. Pages, 269. With 78 illustrations. Cloth bound, \$1.00.



Poor motor oils could not exist if all owners knew the difference

It costs only \$3 to \$4 a year more to stop abusing your motor and use the proper oil.

That's why the leading manufacturers are investigating oils and vigorously advising the use of Wolf's Head Oil.

Here are some of the famous manufacturers who already use or advise the use of Wolf's Head Oil:

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Mercedes
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Itala
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Sampson Truck
Brush
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Chas. L. Seabury & Co., Cons.
Van Blerck Motor Co.
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Builders of Motor in the
celebrated "Detroit."
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WOLVERINE LUBRICANTS CO., MAIN OFFICE, 78 BROAD STREET, NEW YORK

Also sole Manufacturers of the famous PACKARD Oils

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Insist Upon Wolf's Head Oil—

Just As the Motor Manufacturers Do

Billings & Spencer Tools

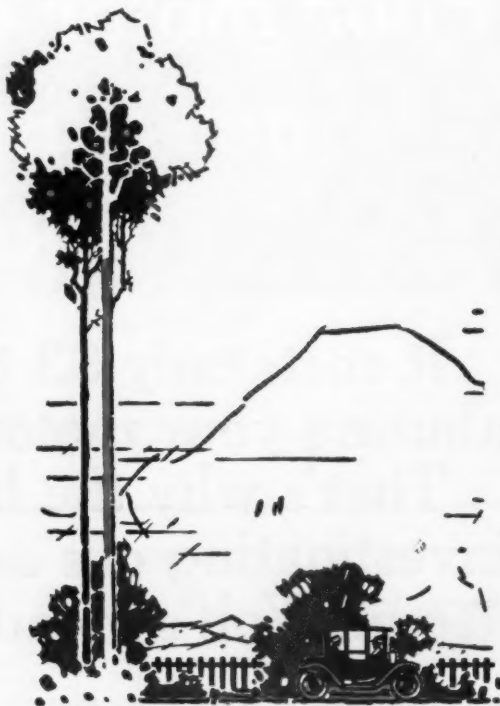
"The tools that are guaranteed"



Under the smooth, lasting finish of all B & S tools lies the flawless, thoroughly tested, drop-forged steel that has made them so famous for strength, durability and ease of action.

Write for Catalog

The Billings & Spencer Co.
Hartford, Conn.



The LUXURIOUS BROC ELECTRIC

THE power can't be on while the brakes are on.

That's an exclusive Broc feature which means much to Broc owners—and dealers.

Cut-off is automatic—whenever brakes are applied, or controller-handle reversed.

Both forward-drive and rear-drive models, with individual stationary or revolving (pedestal) front seats. Several seating-arrangements to choose from. On the forward-drive, lever-steer or wheel-steer is optional.

Exide or Ironclad Batteries



**The BROC ELECTRIC
VEHICLE COMPANY**

1675 East Fortieth St. Cleveland, Ohio



See What Brilliant Gould-Battery-Served Lights Do Here

This road, smooth and such that you would naturally run fast, turns abruptly, a dingy fence ahead and two poles located to make safe turning impossible in the dark. But electric lights can always be depended upon to show up such danger spots far in advance.

Brilliant lights from a Gould Battery make night riding a real pleasure—make reasonable speed possible without having to fear ruts, stones and collisions.

The cost of installing a Gould Battery and lighting system is now less than ever and the protection so good that you can't afford to take chances longer.

Write for book:
"Lighting Automobiles by Electricity"

Gould Storage Battery Co.

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Full Stock of Parts, Plates, and Repairs Carried by All
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HERZ PLUG



Eventually, *you* will disregard the cheap hardware commonly called "Spark Plugs," and use the HERZ PLUG—the only Plug that is or can be

GUARANTEED A YEAR

The usual Spark Plug troubles are unknown to users of the HERZ PLUG. Once installed, it never is taken out.

Double Blue Enamel Stone

No Sooting—No Cleaning
No Porcelain—No Breakage

No Experiment: In Its 20th Year

Price, \$1.50 postpaid. Ask your dealer, or write us.
We also make the HERZ MAGNETO

HERZ & CO. 295 Lafayette St., New York

Samuel T. Freeman & Co., Auctioneers

1519-21 Chestnut St., Philadelphia, Pa.

Receiver's Public Sale

*In the District Court of the United States for the Middle District of Pennsylvania.
In re—Bosch Magneto Company vs. Matheson Automobile Company.*

Valuable Plant of The Matheson Automobile Co. Wilkes-Barre, Penna.

**Tuesday, May 20, 1913 and following
days at 10:00 A. M. on the premises**

The sale comprises the complete plant of the Matheson Automobile Co., consisting of Real Estate, buildings, machinery, power, heat and light plants, 35 finished cars, 1912 and 1913 models, merchandise, supplies and parts for all the Matheson Models, drawings, tools, jigs, dies, franchise and good will, accounts receivable, repairs, office furniture, factory fixtures, together with the parts, cars, fixtures and office furniture at the New York Branch at No. 1886 Broadway, New York City.

At invoice price the plant and equipment aggregates about \$750,000.

Descriptive catalogue comprising over 2,000 lots will be mailed upon request.

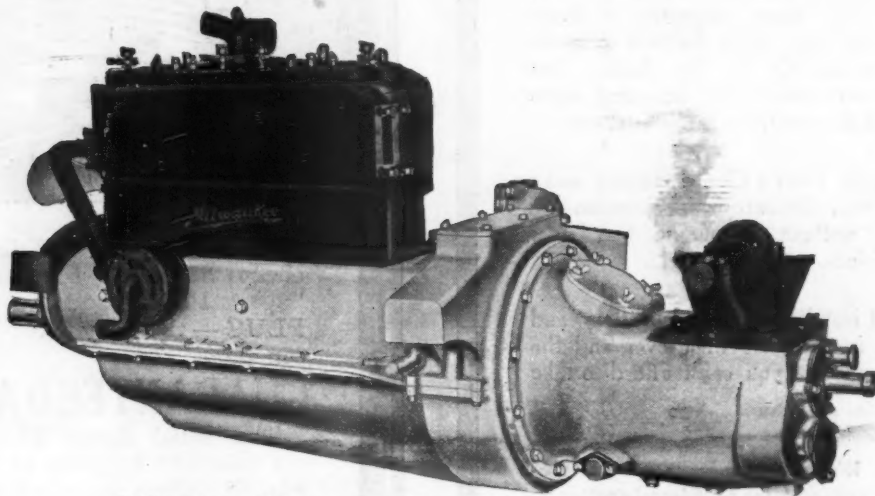
Sale peremptory

By order of William C. Shepherd, Receiver of The Matheson Automobile Co.

SAMUEL T. FREEMAN & CO., Auctioneers

1519-21 Chestnut Street, Philadelphia, Pa.

Milwaukee—The Silent Motor



Milwaukee 4-Cylinder, En Bloc, Unit Power Plant (4½ x 5½)

MILWAUKEE Motors are as silent as they are durable. In point of structural achievement they stand unchallenged. They are enclosed throughout—are dust and oil-proof. They are furnished as UNIT POWER PLANTS, or without transmission, clutch and control. They are built to accommodate any standard transmission. They can be equipped with any standard electric starting and lighting device. Made in the following sizes—

4-Cylinder Motors

4 5/16 x 4½, UNIT POWER PLANT or alone. Cylinders cast in pairs.
4½ x 5½, UNIT POWER PLANT or alone. Cylinders cast in pairs.
4½ x 5½, a special truck motor. Cylinders cast in pairs. Not furnished as UNIT POWER PLANT.
4½ x 6, UNIT POWER PLANT or alone. Cast en bloc. For pleasure cars and light trucks.

6-Cylinder Motor

4½ x 5½, UNIT POWER PLANT or alone. Cast en bloc.

Write for descriptive matter

MILWAUKEE MOTOR COMPANY, Milwaukee, Wisconsin

When Writing to Advertisers, Please Mention Motor Age.

One Distributor

In Every Town for Mansfield

CABLE-STRUCTUR TIRES

WE have a very liberal proposition for one man in every town. Read, here, the 11-month record of Mansfield Cable-Structur Tires. The record itself will enthuse you. The evidence given here will convince you.

The Cable-Structur Record

In April, 1912, we began making Mansfield Cable-Structur Tires. The General Manager's order was "Cable-Structur must be the best tire in the world." We knew that was possible, if profit did not interfere. So we disregarded profit. Nothing was allowed to stand in the way of the best possible quality.

The Cable-Structur tire quickly won. The quality was simply irresistible. So was the Mansfield type of construction.

In the first 11 months, over 21,000 Mansfield tires went into service. They were put to the hardest tests motorists knew.

But now listen:

Result of the 21,000 Tire Test

Out of the 21,000 tires tested out in an 11-month, all but 141 Cable-Structur tires proved better than our claim, only six-tenths of one per cent. And those were replaced.

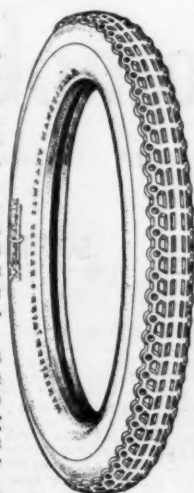
That is the best record any tire ever made.

Now we give the specific reasons for such a record.

The Cable-Structur Base

The Cable-Structur tire has no hooks on the base. None are needed. The hooked base is illogical, troublesome and expensive. Instead, we use 24 endless, no-stretch steel wires. 12 wires on each side are vulcanized in the center of a semi-hard rubber bead.

The 24 wires have a tensile strength of 16,800 pounds. Nothing can wrench the tire off the rim over the flanges.



Mansfield
CABLE-STRUCTUR

The Mansfield Tire & Rubber Co., Mansfield, O.

(101)

Avoids Rim-Ruin

In that way we do away with rim-ruin, and save its consequent costs, for this reason:

The flange hooks are turned away from the tire, so no damage can be done, if the tire is run soft, from any cause.

Extra Load-Efficiency

The very compact Cable-Structur base gives greater air space—greater carrying power—for it's the air that carries the load.

That extra load-efficiency saves blow-outs—and their costs.

The Union of Fabric to Bead

The union of fabric to bead is another strong point of this tire. Each layer of fabric surrounds the cable-bead. Each layer binds the end of another. It is impossible for the fabric to pull away from the Cable-bead.

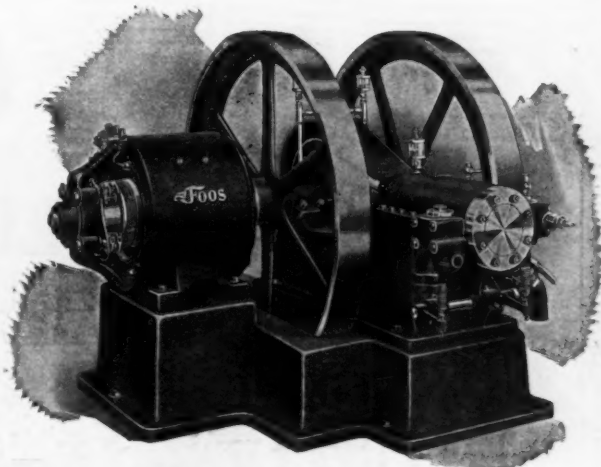
Scientific Hand-Building

Using the highest quality materials obtainable, we build Mansfield Cable-Structur tires by hand, with great care. Hand-building is the logical way to a perfect tire.

And to build Cable-Structur Tires, we picked skilled, long experienced, and conscientious tire men. We pay them by the hour, at highest wages. Thus Cable-Structur tires are never rushed out, or slighted.

Men Write for Our Special Distributors' Proposition

Now, men, you have a chance to control the sale of Cable-Structur tires in your territory. We have a very liberal proposition for ONE man in your town. If you want it, write today.



THE FOOS

27 years of successful leadership in gas engine design and construction. Always dominant in quality, workmanship and performance.

Thomas B. Huling, in his machine shop at Lampasas, Texas, has a nine-year-old engine that shows what kind of stuff the FOOS is made of. The total replacements for nine years were an inlet valve, an exhaust valve guide and a couple igniter blades. Its yearly repair bill was 25 cents—6¼ cents per H. P.—a total repair expense of \$2.25 for nine years. This engine has paid for itself several times in fuel economy, low cost of maintenance and satisfactory service. It is still practically a new engine and will give reliable service for 15 or 20 years more.

The service obtainable from a Foos Engine for electric or power purposes is absolutely dependable. These engines are built for almost every service requiring power, and can be furnished in many sizes, from 2¼ to 325 H. P.

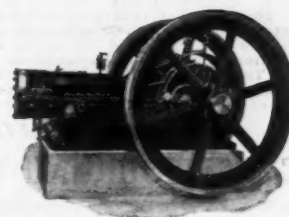
CATALOGS


F53—FOOS STANDARD 3 TO 90 H. P.
J53—FOOS JUNIOR 2¼, 4, 6 & 8 H. P.
V53—FOOS VERTICAL 35 TO 325 H. P.

The Foos Gas Engine Company

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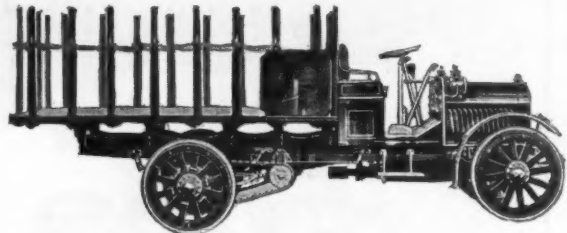
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represents a greater cash value than any other one-ton truck. It is built for hard service and embodies every feature that stands for Durability and Economy—the two chief requisites of an efficient business vehicle.



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The Selden Truck is sold on the Time Payment Plan and therefore earns its own cost

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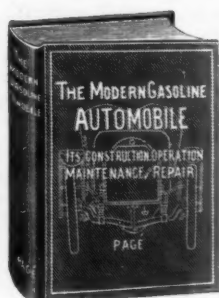
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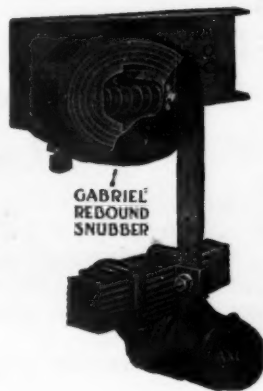
worm-gear power-transmission; universal application of magneto ignition; development of automobile electric-lighting systems; block motors; underslung chassis; application of practical self-starters; long stroke and offset cylinder motors; latest automatic lubrication systems; silent chains for valve operation and change-speed gearing; the use of front wheel brakes and other detail refinements.

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Standard Equipment on the Easiest-Riding Cars



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REBOUND
SNUBBER

Quickest and easiest to put on. Simply clamp coil to frame and pass belt around axle. No drilling or otherwise marring the car.

As springs compress and frame approaches the axle, the coil takes up the slack in the belt. Then, as the springs begin to expand, friction within the coil forms a resistance in direct proportion to the severity of the rebound of springs.

No abnormal expansion of springs, no side-swaying or tossing-up or banging-down of the car body.

Snubbers protect passengers and mechanism from jolts and jars, cut down repair bills and add many thousands of miles to the car's life.

But, if you want all the riding ease your springs can give, without the side-swaying, the tossing up and the banging-down on uneven roads, the **only** device to use is Gabriel Snubbers.

You will never know how easy your car can ride until you use them.

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THE "Auto-Lite" electric starting and lighting system has always been a six-volt system. We were the pioneer manufacturers of starting and lighting devices employing a six-volt current.

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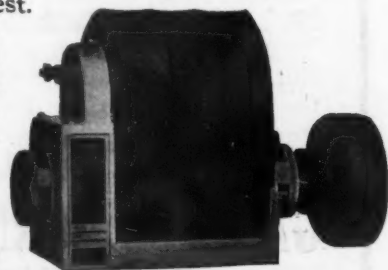
ceives all our attention. We are electrical accessories experts.

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The Pump that took the "Shun" out of Inflation

It's a pleasure to inflate your tires without sweating, fuming and straining.

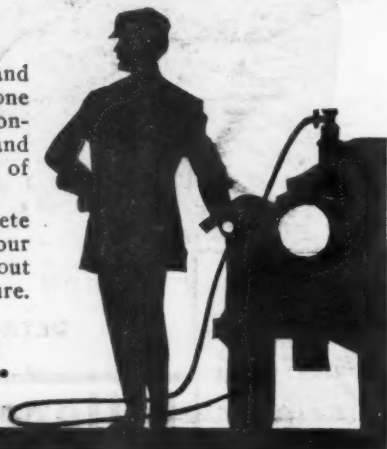
It's an economy to get the exact pressure you need to make your tires give maximum service.

It's a convenience to attach and detach your pump without a wrench. A twist of the wrist and a few seconds of time to attach the pump, one to four minutes with your motor at low speed to get the right pressure. The gauge tells you when to stop.

The Brown Impulse Tire Pump for 1913

is the only tire pump that attaches and detaches without a wrench; the only one that includes hose, self-opening valve connection, high grade recording gauge and Quick Detachable Spark Plug as part of its regular equipment.

Your 1913 equipment is not complete without it. It sells for \$15.00. Ask your dealer today. If he can't tell you all about it, send to us for descriptive literature.



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Don't Experiment

If Bunting Bearing Bronze



Were Not

the best bearing metal to be had it would not be used on 60% of the cars produced in 1913

And It Is

Produced in cored bars of convenient sizes for the replacement of worn bushings and bearings

Ask for **BUNTING BEARING BRONZE** in cored bars and get what the manufacturer used in building the car. Machines easily, wears long, will not scratch the shafting, will not granulate, and is low in price.

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Contracts Now Being Made for 1913-1914 Agencies

**Model 36-42
5-Passenger
Touring—
Fully Equipped**



Glide

\$1690

The Car That Looks and Acts the Thoroughbred It Is!

The man about to buy a car or the dealer contracting for deliveries is doing himself an injustice if he does not fully investigate the *Glide* 36-42 before deciding on any make car, regardless of price.

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If you've got a wrong impression of the *Glide* because it sells for only \$1690, read a brief outline of the car given here and you'll see that the *Glide* is not a "cheap" car; but, in the strictest sense of the word, that it is a car of quality.

Automatic Dynamo Lighting System
Unit Power Plant
Long Stroke Motor with enclosed valves
Left Side Drive
Electric Side Lamps in Dash
Floating Rear Axle with Pressed Steel Housing
Self-Starter

Demountable Rims (Baker Bolted-on)
118-inch Wheel Base
Motor-Driven Tire Pump
Center Control
Electric Headlights and Tail Lamp
Goodyear No-Rim-Cut Tires

Thousands of these cars are running season after season with entire satisfaction to the owners and with no responsibility to the dealer.

Dealers are rapidly applying for agency contracts to sell the *Glide* through 1913-1914 season, but there is still much desirable territory, which we will assign to those who are prepared to represent us intelligently and aggressively. Write for catalog, agency proposition and full information.

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Goodman Tire Shields are blow out proof and prevent punctures. Put new life in old tires and multiply your mileage in new ones. Make us prove it. We will send a sample section which you can use as a blow out patch. Test thoroughly in a weakened tire. If it proves itself, order complete shields; if you are not satisfied return to us, and we will refund price paid. Send \$1.00, stating size of casing, and we will send immediately, postpaid. Agents can use these sections to sell from. Liberal Proposition to Agents.

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"You must be lubricating everything but the places you ought to. Remember there is only one gear compound that is a money saver—that's the Badger."

Use

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It's "Always On the Teeth"

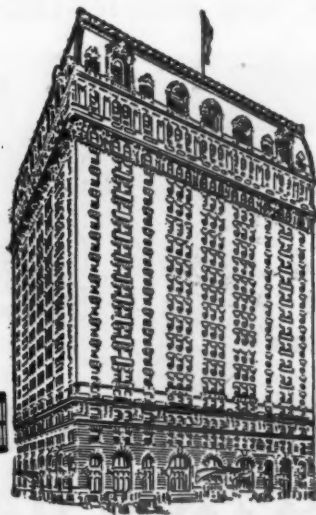


Never runs thin. Stays where you put it. Doesn't pack the sides of the gear case. Gives long mileage for little money. Effective noise-killer for rear axles and transmissions. We also make F. V. Motor Oil and Badger Lubricants. See your dealer or write us.

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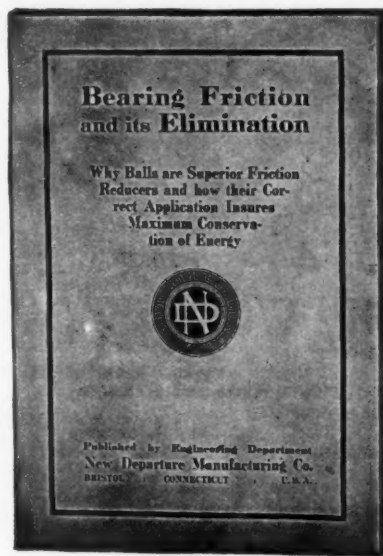
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This first brochure is entitled "Bearing Friction and Its Elimination," and aims to show why balls are superior friction reducers and how their correct application secures maximum conservation of energy.

The types of bearings particularly discussed and compared in this writing are the ball and roller bearings, as applied to all bearing points in the motor car.

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This brochure will interest you. Copy will be mailed you promptly on request.

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Improved Adjusted Lock For Installing and "Take-up"

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Dept. M-1.

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are assured to the greatest extent
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WESTON

**SWITCHBOARD
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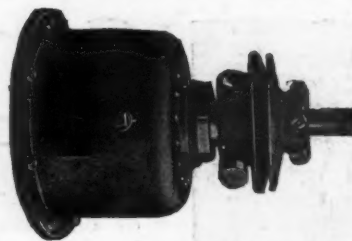
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The Hele-Shaw is the only clutch that can be made
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Has a grip like a vise but is slippable indefinitely,
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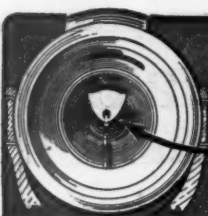


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just **this high**
when you use

The Prest-O-Lite Automatic Reducing Valve

With this device attached to your Prest-O-Lite, you do
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Turn on the gas, light your lamps, and the flame is bound
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It pays for itself in gas saved, so its convenience costs you
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Unlike other reducing valves, the Prest-O-Lite Automatic
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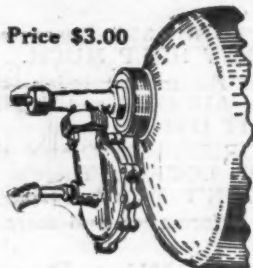
Anyone can attach it in less
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Your dealer has it or will quick-
ly get it for you. If not, we'll
send it to you on receipt of price.
Try your dealer first. Every
Prest-O-Lite Branch Office has
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The Prest-O-Lite Co.

233 E. South St., Indianapolis, Ind.

Price \$3.00



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We have established a number of distributing agencies, and are making new connections every day for the sale of this really wonderful tube.

We were convinced by our thorough tests before we offered this tube to the public that it was O. K.

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We solicit your inquiries.

Manufactured exclusively by

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KOKOMO, INDIANA



Type I-F Ammeter

METERS are as essentially a part of the electric lighting equipment as gauges are a part of the steam boiler, and who would think of operating even a small steam heater without suitable gauges?

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By means of the gauges you are enabled to operate your boiler more intelligently and increase its efficiency.

If a manufacturer tells you that meters are unnecessary with his lighting equipment, he deceives himself. If you rely on his statement, you deceive yourself.

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are the accepted standard in automobile lighting.

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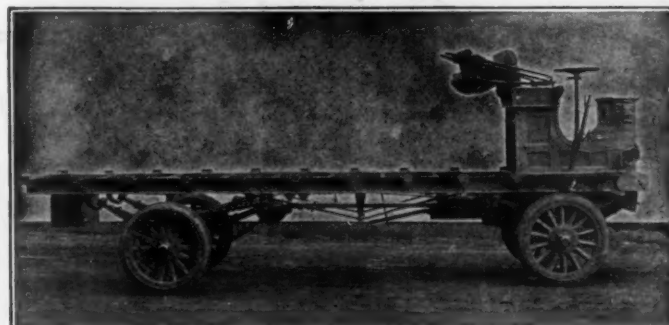
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Johnson Trucks

1-Ton
2-Ton — Chasses
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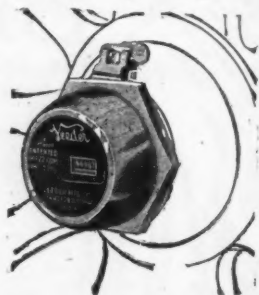
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Neat, durable and compact, it can be easily attached. Price complete. **\$25.00**

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Now is the time to think of your hands. Don't mar your summer motoring pleasure by ill-fitting, sweaty gloves. Keep cool hands at the wheel, have clean hands after making repairs.

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Made for motorists. They "fit the hand." Roomy, shapely, smoothly seamed inside. Coltskin and "Reindeer" stock. Soft as kid, and wear like rawhide. Light on the hand and very flexible. And then, they're

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Rows of tiny holes along backs of the gloves admit the breeze but not the dust. Perspiration is evaporated and the hands kept dry and cool. The "Rist-Fit"—V of soft leather in cuff with strap of leather for easy adjustment, keeps glove snug at wrist and gauntlet always in place. A motoring glove of utmost grace and comfort. Sold in almost every city. See them—also our street and dress gloves—at your dealer's.

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THROUGH 14 years we have built magnetos; there are more Remy's in use this year than all the other makes combined; for two years we worked to develop the best lighting generator—a simplified, self-regulating generator; now after gathering to our factory the greatest starting authorities in the world, we have perfected the Remy Starter. It will spin any motor any time with the minimum draw on the battery. We are today the only concern building a complete electrical system—in whole or combination—for automobiles.

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Le Télesco

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and hydraulic Shock Absorber is now made in America. Offices are being opened in principal cities and orders will be promptly filled.

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Refrigerator Baskets



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The Hawkeye Fitted Lunch Basket—a full-fledged dining outfit, containing coffee pot, saucepan, plates, cups, knives, forks, spoons, etc. A complete luncheon outfit for large outing party.

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Ask for Free Book—tells all about Hawkeye Refrigerator Baskets—gives prices also—contains recipes for outdoor dishes. We send you name of "Hawkeye" dealer in your community. Write now, while you think of it.

DEALERS: Get our Proposition!

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44 Main Street, Burlington, Ia.

(2)

THE REASON The BUCKEYE SURE-STARTER Saves 25% of your gasoline

NO more churning and grinding until your back is lame trying to start your car. Just prime your motor with a "Buckeye Sure Starter." Then one turn of the crank—and you are off.

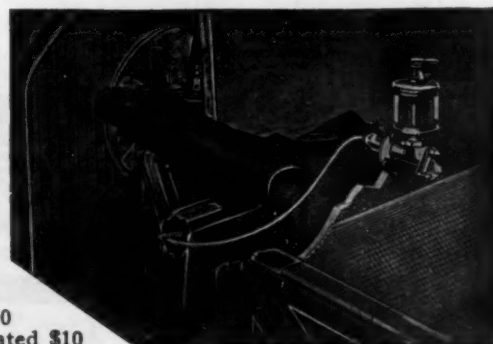
Shifting the air control lever to the right admits to the manifold a "just right" amount of air for a mixture of highest efficiency and guarantees you a 25% increase of power and a 25% saving of gasoline. Carbonization is effectively prevented by feeding kerosene to the cylinders through the "Sure Starter" once a week.

The "Sure Starter" will soon pay for itself in fuel economy alone

Price is within the reach of every motorist.

Anyone can readily attach in one hour's time.

Price complete:
Brass \$9.50
Nickel Plated \$10



Absolutely Guaranteed or Money Refunded

AT ALL DEALERS OR DIRECT ON RECEIPT OF PRICE

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The Central Brass & Fixture Company
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Detroit Mechanical Starter For Ford Model T Cars

Enables you to crank your engine from the seat. It operates mechanically—no electricity, no gas, no air.

It is perfect in construction; simple and easy to operate.

No danger from back-firing. No possible harm to the motor.

The Detroit Mechanical Starter is easily attached, light in weight, positive in operation.

It is guaranteed free from mechanical defects for sixty days and is low priced. Write us for further information.

DETROIT MECHANICAL STARTER COMPANY
1191 Woodward Avenue Detroit, Michigan

Our Engineers

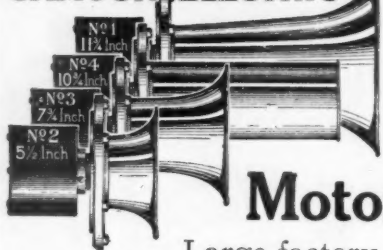
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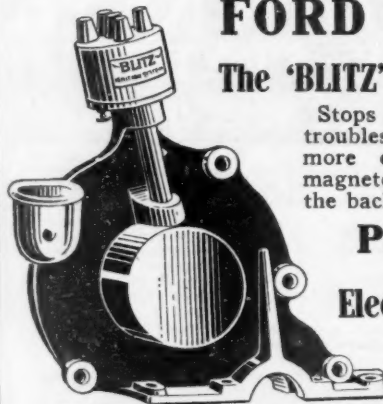


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The 'BLITZ' Ignition System



Stops all of your ignition troubles. Makes your car more efficient. Uses Ford magneto current. Eliminates the back kick.

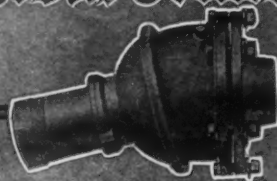
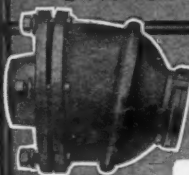
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It makes no difference what you are looking for—whether a factory superintendent, salesman, foreman or chauffeur—you will find the man listed in MOTOR AGE classified columns.

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Every J-M Spark Plug has both a mica and a porcelain insulation, either of which is sufficient in itself to prevent any leakage or short circuit—even when current is furnished by a magneto. Therefore, double protection against insulation troubles is positively assured by the use of

J-M SPARK PLUG

Furthermore, the center electrode is scientifically tempered to withstand the highest temperature of the engine, and after being assembled, all parts are subjected to heat and thoroughly baked to prevent undue expansion in service.

Firing points are made of Platinum-Iridium and Nickel alloy and will not fuse, pit excessively or carbonize.

J-M Plug combines all the advantages of both the all-porcelain and the all-mica types, and embodies many features of individual merit.

Its superiority has been proved by the most severe service tests.

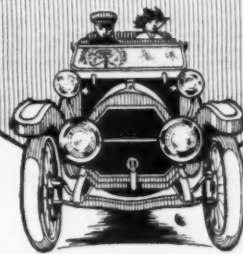
All sizes can be used for magneto or battery—Price \$1.00 each. Sent prepaid from our nearest branch if not at your dealers.

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Be Safe on the Steepest Hill

You know how many serious accidents occur on hills when brakes fail to hold, due to the brake lining having become charred or disintegrated. Your safety, therefore, depends almost entirely on using a lining that frictional heat cannot char or burn, and whose gripping power cannot be impaired by water, oil, grit, etc.—a practically indestructible lining—

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This lining is practically indestructible because made of strands of pure, long-fibred Asbestos interwoven with strong brass wires. It stops car almost instantly in emergencies, yet slows down or stops a car as gradually as desired. By actual tests, it outwears at least twelve ordinary linings. Sold by most dealers. Name on every piece.

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ACT INSTANTLY

Whether car goes
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"Years and years of knowing how -
Make Timken Products famous now"

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6 Cyl. 50 H. P. \$5000
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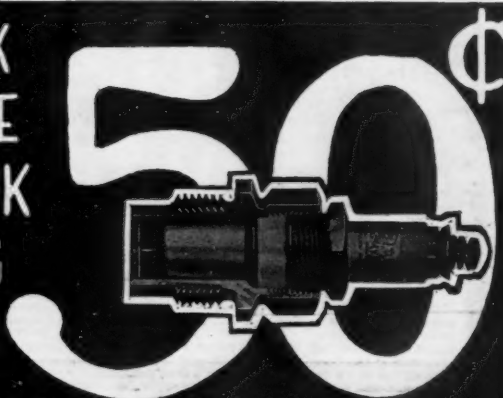
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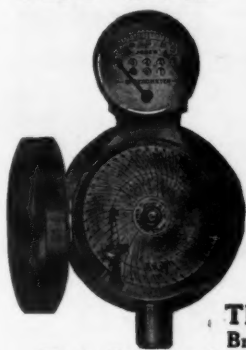
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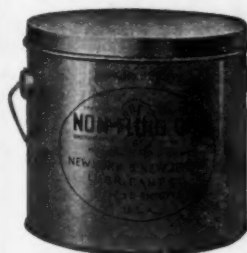
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Make for greater resiliency, smoother riding. Save tires. Are quickly and easily removed. Practically indestructible. Absolutely rust-proof. Now being manufactured in America by the Standard Roller Bearing Company, of Philadelphia.

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This device saves the expense of tearing down the motor, eliminates disturbing the bearings and adjustments which are difficult to secure again; does not scratch or nick the cylinders which a sharp edge tool is likely to do in the old hand scraping way.

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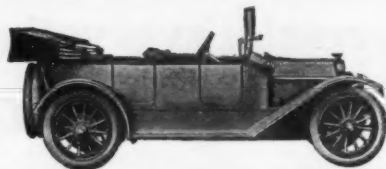
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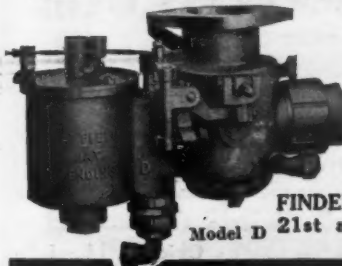
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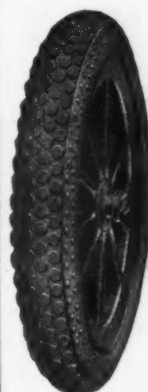
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Bodies slightly higher.

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It consumes nothing but the waste energy of your engine and out-lasts the car.

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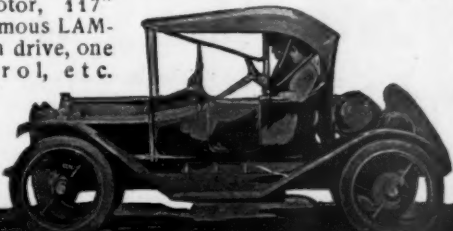
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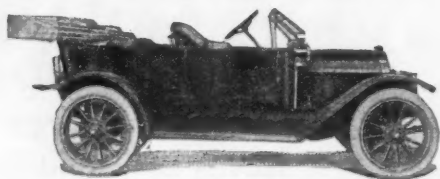
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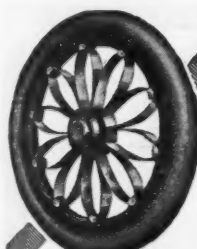


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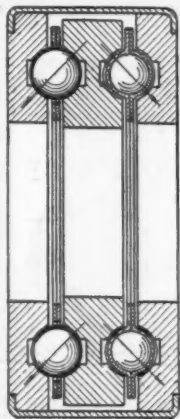
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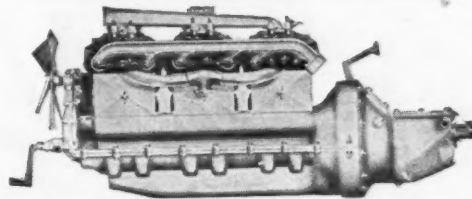
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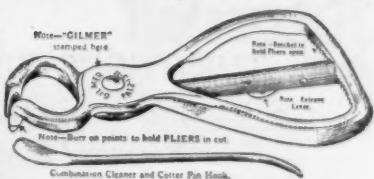
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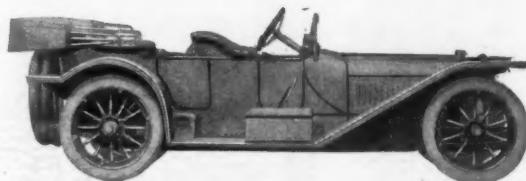
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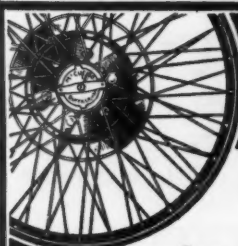
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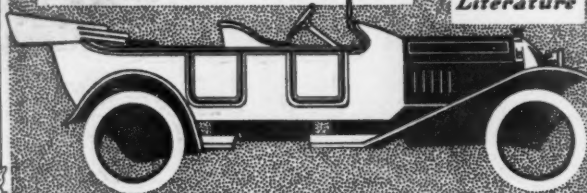
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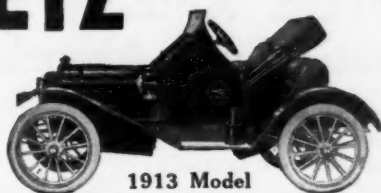
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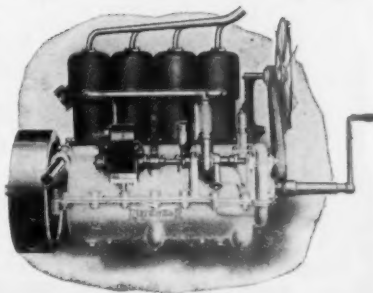
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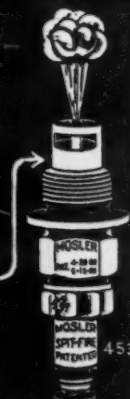
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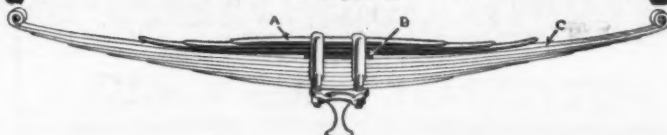
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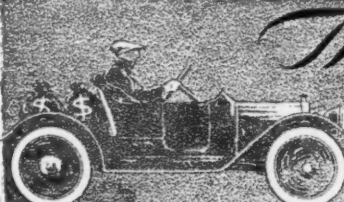
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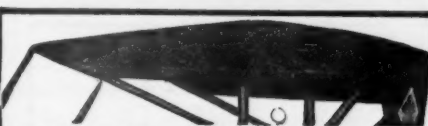
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Doors made for all makes of cars. Guar-
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We have patterns for most every car. F. E.
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\$90.00. Latest Ford roadster body. \$35.00. Tops, curtains included. Mac Innis Bros., Toledo, Ohio

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Puritan Machine Co.,
51 Tenth St., Detroit, Mich.

MANUFACTURERS' SALE 50% OFF PURCHASE PRICE.

60 New Ejector Mufflers, each.....\$ 2.50
Frames 112" and 124" W. B., Straight and Kickup\$12.00 to \$15.00
Frames, unassembled, 112" W. B., Kickup 10.00
Wheels, 32 x 3 1/2-34 x 3 1/2, etc., per set\$10.00 to \$15.00
Axles, front and rear, 30 to 50 H. P.
5 Pass. Bodies, rough and leaded, not upholstered\$ 10.00
Atwater Kent systems, Broadcloth, odd trimmings, garage flash sign, showcase, running board brackets, spring hangers, starting cranks, rough flywheels, drive shafts, a few auto tops, etc.
Ask us for Particulars.
Address,
Box D 364 c/o Motor Age.

MORA REPAIR PARTS

We purchased the repair business of the Mora Company and have in stock repair parts for all models of Mora cars. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

MAXWELL PUSH ROD ADJUSTERS

\$1.50 for complete set delivered. Money back guarantee. Auto Parts Co., Providence, R. I.

MOTOR CAR ROBES.

The finest automobile robes are the famous Londonderry and Glengarry robes. They are guaranteed all wool; 58x80 inches fringed edges on ends; Scotch plaids, etc. Price, \$6.00 each. "Beauties." Let us send you one. Weight nearly 6 pounds. Fast colors. Yours for style and comfort.
All Wool Robe and Blanket Co.,
Newark, Ohio.

MR. (FORD) OWNER AND GARAGE MAN
The Townsan Valve Adjuster has a cushion for your valve-stems. Takes away the click, absolutely silencing the valves. No screws or burrs to work loose. Saves putting in new push-rods and valve-stems. They never wear out. Price \$1.50 by mail. Ask your jobber, or address Townsan Auto Specialty Co., Mitchell, S. D.

NICKEL PLATE YOUR AUTO TRIMMINGS
with Electro-Nickel. Prevents brass from tarnishing, iron from rusting. This is not a silver or mercury wash. We guarantee it plates (without a battery). Price \$1.00, express prepaid. Write for information. Gun Metal Finish Co., 313 Powers Block, Decatur, Ill.

OXY-ACETYLENE WELDING PLANTS.

The Admiral Welding Machine is the ideal welding device; large capacity; self-generating throughout; portable; complete in every detail; a perfect machine for all work, large or small. Send for our booklet, "Welding," and full description. Price, \$200 f. o. b. Kansas City. Admiral Mfg. Co., 715 Lydia Ave., Kansas City, Mo.

PEERLESS AUTO TOP DRESSING.

For mohair, duck and canvas automobile tops and curtains. Waterproofs leaking tops. Makes old tops a uniform color. Ask your dealer.

The Columbus Varnish Co.,
Columbus, Ohio.

PENNANTS FOR AUTOMOBILES MADE
in rights and lefts from any colored felts desired; size 12x30. Price \$1.00 per pair. Cash with order. Liberal discount to dealers. J. C. Orcutt Co., Inc., Lincoln, Neb.

PUNCTURFIX SEALS PUNCTURES AU-
tomatically—fixes punctures while riding, without loss of air; increases mileage of tires and pleasure of riding 100%. Call and witness demonstration or write. Money making territory now open to hustlers. Chicago Motor Co., 1157 S. Wabash Ave., Chicago.

PEERLESS LINING DYE.

For dyeing the inside of all cloth tops and curtains. Makes faded, stained and grease spotted linings a black uniform color. Ask your dealer.

The Columbus Varnish Co.,
Columbus, Ohio.

PRICES THAT TALK.

Flanders "20" tops\$13.50
Carburetors 1 1/4" (Mayer or Holley).... 3.50
Barnes Steering Gears..... 10.00
Splitdorf magnetos and coil..... 20.00
Trunks (size 31x17x12) 4.00
Side lamps (black and brass) per pair 3.50
E. M. F. Springs (rear)..... 2.50
Universal joints 1/4" 5.00
16" ball bearing fans 2.25
12" ball bearing fans 1.50
Hyatt roller bearings (all sizes)..... 1.50
Head-light brackets 7" span....a pair .50

Write for our new bargain sheets.

Auto Parts Mfg. Co.,
Detroit, Mich.

PEERLESS LEATHER TOP DRESSING.

For leather, rubber and pantasote tops and curtains. Softens the top and renews the finish. Ask your dealer.

The Columbus Varnish Co.,
Columbus, Ohio.

PRESTO SELF STARTERS—WE HAVE A
few upon which snap price will be given.
Algona Auto & Mch. Co.,
Algona, Ia.

RADIATORS—NEW GUARANTEED GOODS

Ford, Model T.....\$16
Buick Model 10..... 22
Buick Model F..... 25
Chalmers-Detroit 20
Everett 20
Stoddard-Dayton 25

Any other make required at equally low prices.

Times Square Automobile Co.,
1210-1212 Michigan Ave., Chicago.

REZINOBRACED.

A CARBON REMOVER, NO FAKE.
SEND ONE DOLLAR FOR FORMULA.
REZINOBRACED, BOX 34 PLATTEVILLE,
WIS.

SCHEBLER MODEL "L" CARBURETORS,
new, 1 1/4 or 1 1/2-inch, \$8.00 each. Order early. Kent Motor Car Co., Kenosha, Wis.

REPAINT YOUR CAR YOURSELF—WITH
our materials and full instructions, you can repaint your car as well as a regular painter and save from \$25 to \$50, depending on its size. Previous experience unnecessary. Latest colors. Write today for full information and color cards. We also make Liquid Gun Metal, the National Brass Enamel. \$1 a can, express prepaid. The only articles of proven merit for lamps, radiators, etc. No polishing. Arsenal Varnish Co., Automobile Dept., Rock Island, Ill.

SEAT COVERS FOR ALL CARS—SPECIAL
price on Fords. We clean old covers; make them look like new. Auto Cape Top Co., 2334 Michigan Ave., Chicago.

STEVENS AUTO TIRE VALVE

Adopted by Ralph De Palma, winner of the Vanderbilt Cup at Milwaukee, 1912. Can be attached instantly without any expense to any inner tube stem on any car. Saves one-half the time and labor necessary to inflate tires by any other method. Easily adjusted. Warranted not to leak. 200,000 in use. Send \$1.00 for set of four. Try them 30 days and if not satisfactory money will be cheerfully refunded. Stevens Manufacturing & Supply Co., 504 Fisher Bldg., Chicago.

STOP, MECHANICS! WAKE UP! SEND
50 cents for hand-soap recipe and make it yourself; practice cleanliness; don't pay for fancy cans. A. G. Jung, 450 W. Main St., Madison, Wis.

The "Missouri Test"

Figures don't lie! You can't get away from the facts in the letter on the opposite page. We might tell you that MOTOR AGE classified columns "pulled" almost twice as strong as those of its closest competitor; you might not believe us.

We are giving a regular advertiser in our columns—a man who has taken the "Missouri Test"—an opportunity to tell you what he knows.

He has tried MOTOR AGE, and four others, and MOTOR AGE "pulled" 16% better than 3 of the others combined!

To save yourself the cost of experimenting, permit us to "show you" first.

TIRE FLUID "GOO GOO" TIRE FLUID
Closes punctures in Auto Tubes. I will furnish receipt for compounding two kinds. Two \$5.00 or one \$3.00. Make 10 gallons for what you pay for two.
Money refunded if not satisfactory.
W. J. SNOOK,
1041 School St., Des Moines, Ia.

TOPS BUILT, RECOVERED AND REPAIRED.
C. G. Meyer & Son, Tiffin, Ohio.

TOURING, ROADSTER, RACING BODIES.
Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.
Auto Sheet Metal Works,
2228 Michigan Ave., Chicago.

TO DOUBLE LIFE OF AUTO TOPS USE GLAZENE

Prevents sun rot and leaks
On tops and on seats.
Costs \$1.00, delivered. Satisfaction guaranteed or money back.
The Glazene Co.,
1328 Jackson Blvd., Chicago.

YOU CAN TURN OLD BRASS ON YOUR
automobile into beautiful, lasting, shining silver plate, easily and quickly, with Orient "Mystic" Silver Plater; to introduce to every automobile owner quickly we will send, prepaid, "concentrate" to make quart of this wonderful plater for \$1, which in bulk costs \$4; satisfaction guaranteed or money back. Orient Chemical Co., 467 Gumbel Bldg., Kansas City, Mo.

1-6-CYLINDER WINTON MOTOR..\$175.00
1-National L. T. Magneto..... 15.00
1-B No. 3 Stromberg Carburetor..... 9.00
1-Eisemann Duell L. T. Magneto,
with coil 25.00
1-Model 2 H. T. Bosch Magneto..... 15.00
Auto Salvage & Parts House
1436 Wabash Ave.,
Chicago

\$17.50 — RAYFIELD CARBURETORS,
model D-3, 1 1/4" vertical intake, brand new. Only a few on hand; \$3.00—Kingston carburetors, 1 1/4" vertical intake, brand new; \$14.00—New Warner steering gears, complete with 18" steering wheel, spark and throttle levers, etc. Other great bargains. Automobile Appliance Co., 1714 Michigan Ave., Chicago, Ill.

Reading this Letter Should Save You Money

New York, N. Y.,
April 21, 1913.

"I am advertising in five prominent auto journals at present, and getting fine results. Although replies do not always mention the journals wherein the person saw the 'ad,' those that did, show the best results from 'ads' in Motor Age. Viz:

MOTOR AGE.....44%
Another prominent
journal.....26%
Another prominent
journal.....25%
Another prominent
journal.....02%
Another prominent
journal.....008%

(Name of advertiser will be given on request)

35 H. P. 2 CYLINDER GAS ENGINE WITH
gas producer direct connected to a 350 light dynamo (110 volts). Can be seen running in fine condition; reason for selling.
J. Kral,
1153 W. 18th St., Chicago.

\$20 FORE-DOOR, FOUR PASSENGER BODIES, untrimmed. Send for photographs. \$18 roadster seats, double bucket upholstered. Automobile Appliance Company,
1712 Michigan Ave., Chicago.

Parts and Accessories WANTED

WANTED
50 Pairs Side Oil or Combination lamps. Must be cheap. Address, Box D. 366, c/o Motor Age.

Cars Wanted

WANTED—SECOND-HAND AUTO IN EX-
change for stock of talking machines, etc.
Address
H. S. Sanborn, Middleport, O.

WANTED—1912 AUTO IN EXCHANGE
for 160 acres of good Minnesota land. Address Box 414, Marshalltown, Iowa.

WANT TO BUY A NEW OR SECOND
hand 16 or 20 passenger Auto buss.
W. R. Holt,
Mitchell, S. D.

80 ACRES WILD LAND PERKINS COUNTY,
S. D. Mortgage \$200.00. Want 1912 auto for equity.
Box 209, Marshalltown, Iowa.

Ball Bearings

BALL & ROLLER BEARINGS, ALL TYPES
Distributors of
"F & S" Ball Bearings.
"New Departure" Ball Bearings.
"Pressed Steel" Ball Bearings.
"Standard" Ball and Roller Bearings.
BALL BEARINGS REPAIRED.
THE GWILLIAM COMPANY,
New York—Broadway, at 58th St.
Philadelphia—1314 Arch St.

Situations Wanted

AUTOMOBILE BODY DESIGNER AND
general foreman of many years' experience desires a position with reliable firm. Address, Box D 356 c/o Motor Age.

CHAUFFEUR OR REPAIRMAN WISHES
position. Reference given as to honesty.
G. L. Kendall,
Jefferson, Ia.

ENGINEER HAS HAD 8 YEARS' EXPER-
ience in the design of pleasure and commercial cars. Is open for engagement. Box D 341, c/o Motor Age.

I WANT TO CONNECT WITH SOME GOOD
square firm, as branch manager, road salesman or sales manager. Salary and commission or a percent of the profits. Six years' experience selling automobiles. Address, Box D 357 c/o Motor Age.

SALESMAN OF EIGHT YEARS OF EXPER-
ience and of wide acquaintance desires to make connection with a live firm where experience and hard work will be appreciated. Until recently was employed by firm manufacturing medium-priced car as assistant sales manager. Had best of reason for leaving their employ.

Can furnish best of references as to my ability and reliability. Address Box D 337, c/o Motor Age.

TRUCK ENGINEER, WITH CONSIDER-
able experience, would consider a change. Address Box D 328, c/o Motor Age.

WANTED—A POSITION AS CHAUFFEUR
in private family; Boston Tech. education; experienced in the care and driving of high-class cars. Best of reference. R. C. Brett,
21 Inman Street, Cambridge, Mass.

Help Wanted

WANTED—A GARAGE FOREMAN. MUST
have mechanical ability and be able to handle men. Steady work, references required. Address Box D 370, c/o Motor Age.

ENGINEERS, SUPERINTENDENTS,
Works Managers, Designers, Production and Efficiency Engineers, and Draftsmen with automobile experience. Inquiries confidential; record must stand investigation when desired. The Engineering Agency, Inc.—29th Year—Chicago.

WANTED—SALES MANAGER BY FAC-
tory making high grade medium priced cars. Must be real salesman. Right place for the right man. Address Box D 369, c/o Motor Age.

WANTED—SHOP FOREMAN WITH AT
least three years' experience on Ford cars and capable of handling men. No smoking or drinking permitted. None but high class men need apply; state wages expected. Address W. E. Greendycke, Amarillo, Texas.

WANTED—50 HIGH GRADE MEN
Managers, Engineers, Superintendents, and Draftsmen with Automobile Experience. The Toledo Engineering Agency,
1228 Ohio Bldg., Toledo, Ohio.

Salesmen Wanted

AN UNUSUAL OPPORTUNITY FOR MEN
with or without technical knowledge of automobiles and motor boats to earn from \$25.00 to \$100.00 a week selling
BETHELEHEM 5-POINT SPARK PLUGS. Guaranteed for the life of the machine. Territory being rapidly allotted. Write today for particulars.

THE SILVEX COMPANY,
Sixty Wall St., New York City.

SALESMAN—ONE WHO IS NOW VISIT-
ing the automobile and truck manufacturers, or the jobbers of automobile accessories, or jobbers of hardware. We have a very attractive proposition. Correspondence solicited and confidential. Sioux City Machine & Tool Co., Sioux City, Iowa.

SALESMEN WANTED
to represent us in territory not now contracted to sell our Auto Combination Ignition Locks; inexpensive, convenient, simple, readily applied to any car. Excellent proposition for your entire time, but can be handled as side-line by salesmen calling on automobile trade and owners. Exclusive territory, terms, etc.

Auto Combination Mfg. Co.,
1467 Michigan Ave., Chicago.

SALESMEN WANTED—ONLY GOOD LIVE
wires who have some knowledge of an automobile to sell direct to car owners the most rapid selling automobile device on the market in all cities and towns. Makes motor start easier, saves 25% of gasoline. Increases power 25% and prevents accumulation of carbon by giving more perfect carburetion. Price is low and device does as represented. Works on any car. Installed in twenty minutes. Opportunity to make big money. Investigate at once.

Automatic Device Co.,
Frankfort, Ind.

SALES AGENTS—ONE WHO IS NOW
visiting the Automobile and Truck manufacturers, or the jobbers of Automobile Accessories or Jobbers of Hardware. We have a very attractive proposition. Correspondence solicited and confidential. Sioux City Machine & Tool Co., Sioux City, Iowa.

"WANTED—GOOD, LIVE SALESMEN
and agents in every city and town here and abroad for our Stewart Piston Gasoline Saver, which has been advertised in this magazine for three years. Apply Halliwell Company, 408 West Pico street, Los Angeles, Cal.

WANTED—TWO LIVE TRUCK SALESMEN. Must be able to produce results. Best of territory open. Trucks range in prices from twenty-five hundred to five thousand dollars. Don't answer unless you can give bond or show best results.

Address,
Box D 358 c/o Motor Age.

Agency Wanted

AGENCIES WANTED.

We are open to take up agencies for good selling lines of anything in motor car novelties.

We have excellent standing among the trade and auto users and are equipped to distribute any article of merit. Our customers are spread over every state in the Union. Keaton Patents Co., U. S. Rubber Bldg., New York.

AGENCY WANTED — SEVERAL GOOD lines by manufacturers' representative calling on automobile and hardware jobbing trade in the entire southern states and Texas, three times yearly. A-1 references. Address Box D 347, c/o Motor Age. b

WANTED.

Agency for an automobile truck and auto manufacturer that will furnish demonstrator to agent. Thos. J. McEvoy, New Orleans, La.

"YOU NEED A RESIDENT PURCHASING

Agent. New York City is the mecca of motordom. Price and quality originate here. We act as Resident Buyer for out of town Dealers and Jobbers. Write for information. Box D 371, care Motor Age. k

Business Opportunities

ATTENTION

The Toledo Automobile Devices Co., of Toledo, Ohio, having all it can do to take care of its own patent accessories, offers for sale a couple of valuable patent devices, suitable for manufacturing on a small or large scale, showing several hundred per cent profit. For particulars address

THE TAD COMPANY,
Toledo, Ohio.

FOR SALE—A WELL-EQUIPPED GARAGE in a new town, county seat of Mellett Co., So. Dak., doing good business. Garage fixtures, tools and supplies; invoices about \$5,000. Must sell soon. C. P. Anders, White River, S. D.

FOR SALE—FULLY EQUIPPED AUTO REPAIR shop in city of 45,000. Good reason for selling. Legal News, Topeka, Kansas.

FOR SALE — HAYWOOD VULCANIZER, Model H. Used three months. Perfect condition. Price low. Box D 335, c/o Motor Age. p

FOR SALE—MOST THOROUGH EQUIPPED garage and general repair shop in Iowa at a bargain. Address Box D 336, c/o Motor Age. f

FOR SALE—ON ACCOUNT OF OTHER

business interests we offer our entire manufacturing plant, building a full line of commercial vehicles and auto trucks, at par value, in a city of 35,000, in the state of Iowa. The business is well established and enjoying a good trade; this is a gilt edge proposition; will invoice about \$50,000. Address Box D 332, c/o Motor Age. b

FOR SALE—THE FINEST EQUIPPED and most up to date vulcanizing shop in Northern Illinois. Including motorcycle agency, accessories, tires, etc. City of thirty-five thousand, no competition. Large outside territory to draw from. A splendid growing business. Must sell at once, leaving city. Address Box D 372, care of Motor Age. g

GARAGE AND COMPLETE MACHINE shop for sale, or will trade for farm land. Located in town of 2000 in best farming section of Indiana. 1912 business over \$85,000 with better prospects for 1913. Has complete stock of tires and accessories, vulcanizing plant, etc. Most completely equipped garage in the country. Must sell on account of ill health.

Address,
Box D 361, c/o Motor Age. s

WANTED — COMPETENT MAN WITH \$5,000.00 or \$10,000.00 to increase the capacity of a concern manufacturing parts and to take charge of the sale of entire product. Good opportunity for right party. Address Box D 334, c/o Motor Age. c

FOR SALE—TIRE FILLING PLANT. COM- plete, with formula and instructions for filling. Absolutely non-puncturable; a real money maker. Investigate.
Box 7, Phoenixville, Pa. r

PLANT FOR SALE CHEAP. Suitable for auto bodies (especially Limousine) and accessories. Power, lights, water, dry kilns, sprinklers, side tracks, abundant storage. The A. J. Phillips Co., Fenton, Mich.

Magnetos

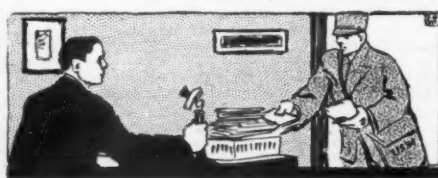
MAGNETOS

Repaired, remagnetized; prompt service on all makes. Get our exchange proposition on new K-W for old equipment.

Spark Coil, Storage Battery and Carburetor Repairs.

Northwestern Distributors.
K-W magnetos, Schebler carburetors, Vesta lighting equipments.

Kellogg Self Starters and Tire Inflators.
Reinhard Brothers Co.,
Minneapolis, Minn.



Kill That Ad!

"I advertised for one assistant. Just hired him. 4 applicants waiting in outer office. Basketful of applications unanswered. Stop my ad."

Tires

DON'T READ THIS

Unless you are interested in the purchase of new and slightly used tires at special prices.

A splendid line of lamps at prices that will interest you.

Monarch Tire & Repair Co.,
1151 Wabash Ave., Chicago. Phone Har. 1440.

ENGLEBERT TIRES

(Made in Belgium.)

Standard in all sizes. Guaranteed 4,000 miles. New and second-hand tires at a great reduction. Send for circular on repair work.

Colonial Rubber Works,
46-52 East 28th St., Chicago.

NEW TIRES

28x3, \$7.20; tube, \$2.40. 30x3, \$7.85; tube, \$2.50. 30x3½, \$11.00; tube, \$3.35. 32x3½, \$12.00; tube, \$3.55. 34x4, \$17.25; tubes, \$4.60. Tubes guaranteed; other sizes accordingly. Get price list, 10% with orders, balance C. O. D. Examination allowed.

Para Auto Tire Co.,
1419 Michigan Ave.,
Chicago.

READ THIS

New and second-hand tires ready for immediate delivery at prices that will vitally interest you.

Do not delay, but send for our price list. And remember, we do repairing that is fully guaranteed.

Lake Shore Tire Co.,
120-124 E. Ontario St., Chicago.

800—TIRES—800

One-half price; new and slightly used; 1912 stock just received from manufacturers in Akron, Ohio. All the stock must be sold to make room.

Serlin Tire Co.,
1073 14th Place, Chicago.
Phone, Canal 2191.

TIRES. TIRES

I will sell you good wrapped tread clincher tires cheaper than any one in the United States. New 1913 stock. Write for prices.

D. Ogden,
Columbus, Ind.

3,500 MILE GUARANTEED CASING AND tubes, 20% discount; new second casings, 40% off; also good used casings cheap; send for bulletin. Auto Tires Sales Co., 1346-48 Michigan Ave., Chicago.

Rebuilding and Repairing

AUTOMOBILE CYLINDERS REGROUND, new pistons and rings fitted. Garage Air Compressors. Cast Iron Brazing Co., Manchester, N. H.

CYLINDERS REGROUND AND FITTED with new pistons and rings, from \$7 to \$11 per cylinder. Gear cutting in steel, brass, rawhide, fibre, etc. Send us your old parts and we will make you new ones like originals, often cheaper than you can get them from the manufacturer. The Crown Machine Shop, Crown Point, Ind.

AUTOMOBILES REPAIRED, RADIATORS, shields, and all kinds of metal work on automobiles made and repaired. Moran, Hudson Ave. and Eagle St., Albany, N. Y.

BROKEN CYLINDERS AND CRANK- cases—send them to be made good as new at fraction of replacement cost. Scored cylinders repaired, \$12. No new pistons and rings required because bore not enlarged. Where cylinders are worn (not scored from loose wrist pin) reboring is only remedy. We do it expertly. Write for complete information and estimates. Waterbury Welding Company, Waterbury, Conn.

CYLINDERS REGROUND, NEW PISTONS

and rings fitted, gear cutting of all kinds and materials, transmission and bevel gears, piston pins and push rods of chrome nickel steel hardened, tempered and ground; guaranteed better than factory; old piston pins reground and fitted to your new pistons; old push rods reground and furnished with new guides, crank shafts, connecting rods, valves, crank cases; any part for your auto or motor reproduced same as original but better; phosphor bronze bushings carried in stock. Send old or broken parts to go by. The shop of quality.

McCadden Machine Works,

St. Cloud, Minn.

CYLINDERS REGROUND

and fitted with new pistons and rings for \$15 per cylinder. We make parts and cut gears of all kinds. Send us your old parts and we will repair or duplicate them in record time. Cracked cylinders, gear cases, etc., welded and made good as new. Aluminum, bronze and brass castings of every description. The Adapt Machinery Co., 1624 Wabash Ave., Chicago, Ill.

POWERFUL AND QUIETER MOTORS ARE guaranteed by us where we regrind your cylinders, with new pistons and rings to fit; the charge is \$10 complete per hole; accuracy guaranteed. Merritt Co., 311 West Fifty-ninth St., New York City.

WABASH AUTO CONSTRUCTION WORKS
1523 Wabash Ave.,
Chicago.

The leaders in overhauling and repairing automobiles. Our plant is completely equipped with machinery and welding outfit. A trial will convince you. All work is guaranteed. Telephone Calumet 670.

Ignition Repairing

ALL MAKES OF MAGNETOS REPAIRED and remagnetized; prompt service; parts for all makes on hand; all work guaranteed. S. Ostewig & Co., Lee, Ill.

IGNITION AND LIGHTING APPARATUS repaired successfully where others fail. Parts in stock for all makes. Send your next work to us and be convinced. Catalogue sent free. Pellet's Magneto Exchange, 1463 Michigan Ave., Chicago, Ill.

Radiator and Lamp Repairing

A-A-A RADIATORS MANUFACTURED and repaired. Radiators of any make repaired and returned same day. We can make any style radiator and ship in three days. Sheppard Co., 1331 Jackson Blvd., Chicago.

AA1 AUTO LAMP REPAIRING
All Radiators Repaired
by expert workmen.
All work guaranteed by the
Michaud Metal Works, 1615 Wabash Ave.,
Chicago. Tel. Cal 5286; Auto 67-337.

ALL KINDS OF AUTO RADIATORS, hoods, fenders and lamps, etc., rebuilt and repaired. Also general sheet metal work. Phone or mail order. L. Blumenfeld & Co., 1919 Wabash Ave., Chicago. Tel. Cal. 4583.

ARROW RADIATOR REPAIR CO.
1331 Wabash Ave., Chicago.
Expert repair work on Radiators, Hoods, Fenders, Dashes, Tanks and Drip Pans. We guarantee all our work. Phone Cal. 1995.

CHICAGO MANUFACTURING COMPANY,
1466 Michigan Ave., Chicago.
Manufacturers of Radiators, Hoods, Fenders and Tanks. New Cores placed in old radiators. First-class repairing. All work guaranteed.

COLONIAL RADIATOR WORKS,
46-52 East 28th St., Chicago.
Expert Repair Work.
Lamps, Fenders, Hoods, Tanks and Radiators.
First-class Work Guaranteed.
Phone Calumet 3669.

DON'T READ THIS
Unless you want the best Radiator repairing to be had at popular prices.
ALL WORK IS STRICTLY GUARANTEED.
All we ask is a trial.
E. B. Schaeffer,
2213-17 Michigan Ave., Chicago.

THE M. & L. AUTO SHEET METAL
Works rebuild and repair radiators, hoods, fenders, tanks, lamps, etc.
1551 Michigan Ave., Chicago, Ill.
Tel. Cal. 2348.

ONLY RADIATOR FACTORY IN NORTH-
west. Eleven years' knowing how. Why send your Radiator down East when you can ship it to us; save Time, Express, Freight, Money, and get best workmanship. Prices right. Make new Radiators; allow for old one.
Todd Manufacturing Co.,
820 Mary Pl., Minneapolis, Minn.

RADIATOR AND ALL METAL REPAIRING
QUICKLY DONE.
Repairs to Radiators, Hoods, Fenders, etc., our specialty. Best workmanship. If in a hurry for your car, try us. Quick and satisfactory service guaranteed.
Auto Combination Mfg Co.,
1467-69 Michigan Ave.,
Chicago.
Phone Calumet 3433.

RADIATORS REPAIRED EXCLUSIVELY—
Facilities enable use to specialize in this branch of repairing so that all work is strictly guaranteed. Further comment is unnecessary. A trial will convince you.
Erickson & Johnson,
2224-6 Cottage Grove Ave., Chicago.
Phone Calumet 2226.

WHY ILLINOIS AUTO SHEET METAL
Works 58-60 E. 16th St., Chicago, Ill., should be given a trial. Because with ten years experience they can guarantee their work in manufacturing and repairing Radiators, Hoods, Fenders, Tanks, Etc.
Phone Calumet 1191.

Welding

AMERICAN WELDING CO.,
2637 Michigan Ave., Chicago.
Autogenous welding of all metals, such as crankcases, cylinders, etc. We positively guarantee all work. Tel. Calumet 3563.

BRAZING AND WELDING CO.
of Chicago.
All metals brazed and welded are guaranteed. Experts in aluminum welding. Send for circular on aluminum welding. 1615 Wabash Ave. Tel. Calumet 5286.

BROKEN CRANKSHAFTS, CRANKCASES, cylinders, flywheels, gear teeth, pistons, perfectly welded and machined, ready to replace. Scored cylinders made new. Booklet. Atlas Welding Works, Rahway, N. J.

WELDING
Cast iron, aluminum and all metals.
National Welding & Mfg. Co., Inc.,
523 Jackson Blvd., Chicago, Ill.

WE WELD AND ABSOLUTELY
Guarantee
our welds to hold, cylinders (cracked in or outside), crankshafts, aluminum crankcases, transmission cases, housings, etc., by the Ox-weld process of welding and cutting metals. Estimates furnished for job or repair welding and cutting operations of all kinds. Ox-weld Acetylene Co., 37th St. and Jasper Pl., Chicago, Illinois. Downtown receiving station, 557-561 W. Jackson Blvd.

WELDING—CYLINDER CRANKCASE AND
Crankshaft Welded Cylinders rebored, \$7.00 to \$11.00 a cylinder, including piston, 8 rings. Sterling Engine Company, 331-333 S. Clinton St., Chicago, Ill.

Garages

PORTABLE AUTOMOBILE GARAGES,
portable summer cottages, all descriptions.
Alfo. Cons. Co., 3652 Armitage Ave., Chicago.

Patent Attorneys

ATTENTION—PATENT YOUR INVENTION
Free search and opinion. Send for inventor's Primer free. Milo B. Stevens & Co., 312 S. Dearborn St., Chicago. Established 1864. Main office, Washington.

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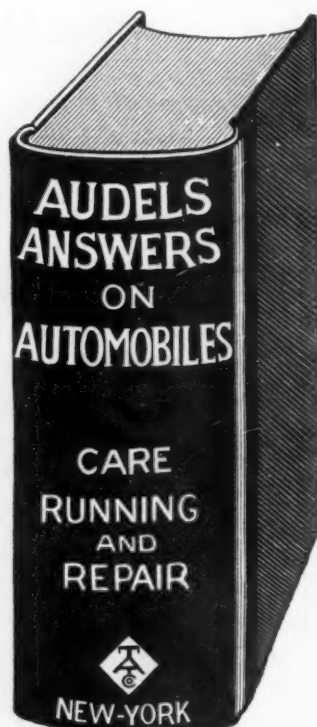
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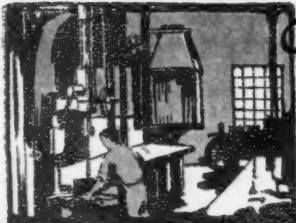
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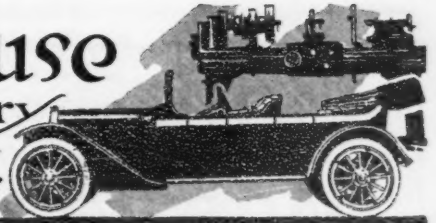
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